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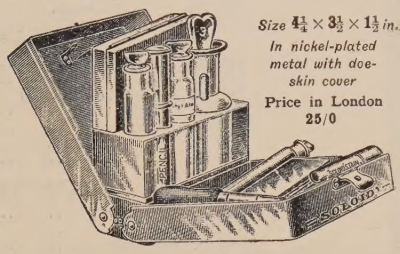

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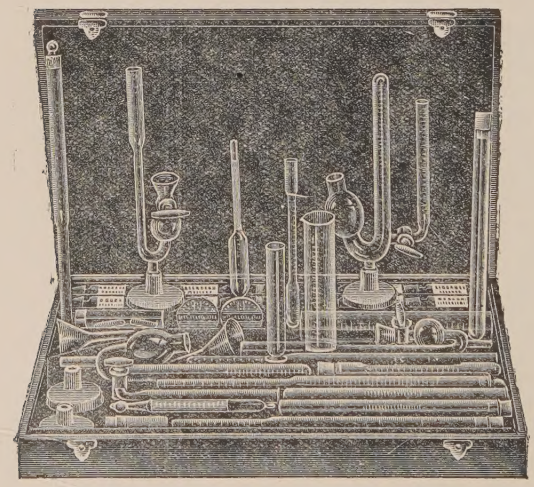

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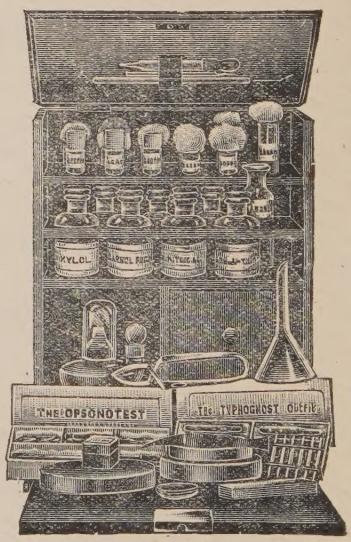

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TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. I.] 1912. [No. 2.

PLAGUE.

Plague in India.

Liston (W. Glen). **Report of the Bombay Bacteriological Laboratory for the Year 1911.**—43 pp. 1912. Bombay: Govt. Central Press.

In this laboratory is prepared all the anti-plague vaccine which is used in India and its dependencies. In the year 1911, 1,211,170 doses were distributed, as compared with 625,690 of the previous year. The laboratory receives statistics of the incidence of plague in the inoculated and uninoculated. These are not published in their entirety, but a selection in the form of thirty tables is given, the figures of which are left to the reader to combine. The reviewer has epitomised them in the following summary.

Inoculated.					Not inoculated.				
Population.	Attacks.	Deaths.	Incidence per 1,000.	Case mortality per cent.	Population.	Attacks.	Deaths.	Incidence per 1,000.	Case mortality per cent.
118,148	941	371	7·96	39·5	321,621	11,041	8,695	34·4	78·6

It is seen that under similar conditions, while the incidence of plague in the inoculated is approximately 8 per thousand, it is 34 per thousand in the uninoculated. Moreover, while the case mortality of plague in the inoculated is about 40 per cent., that of the uninoculated is over 78 per cent.

The Director draws attention to errors of frequent occurrence in plague statistics. The uninoculated population is often overestimated, on account of the exodus from a focus of plague owing to fear of infection. The number of inoculated may be overestimated when monetary rewards are granted. The number of attacks and deaths among the uninoculated is often recorded from

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the date when plague first appeared, and these figures are compared with the number of attacks and deaths after the introduction of inoculation. If inoculation is not begun until the close of the epidemic, the numbers are not comparable. This may be seen more readily with the aid of an example, compiled from pages 12 to 15 of the Report.

Attacks and Deaths from Plague among the INOCULATED and the UNINOCULATED of Salem Town from 11th August, 1910, the beginning of the epidemic, to 31st March, 1911, the end.

Month.	Inoculated.			Uninoculated.		
	Population.	Attacks.	Deaths.	Population.	Attacks.	Deaths.
August	—	—	—	73,000	77	64
September ...	1,375	—	—	61,700	299	250
October	10,720	14	11	37,300	270	255
November ...	20,304	163	86	9,700	585	508
December ...	27,874	156	65	6,130	379	338
January... ...	39,103	93	59	4,900	78	75
February ...	48,514	7	4	7,500	4	4
March	52,440	1	1	8,060	1	1
Totals ...	—	434	226	—	1,693	1,495

To obtain an estimate of the value of inoculation, at first sight all that may appear to be necessary is a census of the population at the end of the epidemic, classifying the people into two groups, inoculated and uninoculated, and an enumeration of the cases of plague which attacked the two groups respectively. The ratio of attacks per 1,000 might then be calculated. Thus at the end of the epidemic in Salem there was a population of 52,440 inoculated and 8,060 uninoculated. 434 cases of plague attacked the former, which equals an incidence of 8 per 1,000 inoculated, and 1,693 occurred in the latter, which gives a ratio of 210 per 1,000 uninoculated. Reference to the table shows that this rate, 210 per 1,000, is erroneous; for during the acme of the epidemic in November there were 585 attacks among the 9,700 uninoculated, which equals an incidence of 60 per 1,000 only. Hence we must not use the census figures at the end of the epidemic in estimating the uninoculated. Let us suppose that the population of Salem remained uninoculated until February and March and that 52,440 inoculations were performed in these months. Eight cases of plague only befel the inoculated in February and March. Hence the incidence of plague in the inoculated, under our supposition, was 0·15 per 1,000. But it is seen in the table that inoculation was introduced at the beginning of the epidemic and that there were 434 attacks of plague among the 52,440 inoculated, which is equal to 8 per 1,000. Therefore if inoculation is delayed until the end of the epidemic, the incidence of plague in the inoculated will be small, and the benefit derived from inoculation may be overestimated. Fallacies of this kind have been excluded from the statistics included in the Report.

The conditions which obtain in a prison are as precise as those of a laboratory experiment. 1,240 prisoners and the establishment were inoculated in Dharwar Jail. Though cases were occurring in the closest proximity none of the inoculated were attacked. 4,386 inmates of His Majesty's Common Prison, Bombay, were inoculated. One developed plague. It was probable that he had been already infected when he was inoculated.

Investigations were undertaken to determine the influence of the age of the culture of *B. pestis* used for the preparation of the vaccine, and the effects of storing it. Cultures of two months' growth are more powerful than those incubated for longer periods. The former give rise to much more severe reactions than the latter. The protective power of the vaccine varies with the severity of the reaction which it excites. Storage mitigates the vaccine. The best results were obtained with a vaccine, prepared from a two months' growth, which had been stored for some months not exceeding eighteen. Experiments with preparations four years old and upward showed that they were destitute of immunizing properties. Inoculation does not produce a negative phase in rats. The immunity reaction commences almost immediately. Anti-plague vaccine can be safely administered to the residents of plague-infected houses. Inoculation begins to lessen the fatality of plague a week after its use. There is a considerable amount of clinical evidence in the Report to the effect that those attacked with plague eight or more days after inoculation suffered mildly. One observer noted that the immunity afforded by the vaccine continued for twenty months.

During three years 444 cases of plague were studied for the purpose of ascertaining the therapeutic value of anti-plague serum. Half these cases were treated by subcutaneous and intravenous injections of the antitoxin, and half without. The fatality of the serum-treated cases was 66·1 per cent. That of the controls was 73·4 per cent. The serum modified the course of the disease; life was prolonged and the number of bacilli in the blood was lessened. No patient recovered under any form of treatment if his blood contained more than forty bacilli per cc.

The well-known difficulty of inducing wild rats to breed in captivity was overcome. A single pair of rats may multiply to forty pairs in a year, though it is probable that this rate of increase is not attained in the field. In the course of a series of epidemics of plague there is evolved a race of rats which is immune to the infection. This discovery is so important, since it allows us to predict the ultimate disappearance of plague, that it is quoted *in extenso.*

"Using for experimental inoculation a minute dose of plague virus, say 12 to 24 thousand virulent plague bacilli which is equivalent to about one hundred thousandth of a grain of an infected rat's spleen, we at present find that 97 to 100 of every 100 rats from Madras City die after infection, and that only some 20 out of every 100 rats from Bombay City will succumb. Not only so, but repeating the experiment with large numbers of rats, we find that plague-free towns, such as Madras, Raipur, Banda, and Dacca, yield rats which give a 90 to 100 per cent. mortality from plague, and that plague-stricken places like Cawnpore, Lucknow, Poona, and Bhagalpur, yield rats highly immune to the disease, and giving a mortality of only 20 to 40 per cent. Moreover the immunity of the rats in each of these places is in proportion to the number and severity of the epidemics from which each town has suffered. Cawnpore shows the greatest immunity with a mortality between 12 and 20 per cent., depending on the dose of plague given. Poona and Bombay rats come next with a mortality between 16 and 25 per cent.; Lucknow and Bhagalpur follow with 30 and 40 per cent. respectively. That this immunity to plague is transmitted from parents to offspring, and is not acquired, is indicated by the fact that young rats from Bombay, and young rats from Poona caught at an age

and at a time when they could not have been exposed to infection, are only very slightly more susceptible to plague than adult rats of the same places."

All the immunity experiments were made on rats (*Mus rattus*) caught in Madras and sent to Bombay.

C. Birt.

Plague in the Far East.

Janssen. **La Peste à Java.**—*Le Caducée.* 1912. Aug. 24. pp. 220–222.

There is a considerable commerce between the port of Soerabaya in the island of Java and India and China. In January 1911 there was great mortality among the rats in the flour and rice stores of that place. Dead rats were found in the cargoes of rice discharged there. This was the source of the epidemic, which in the five following months attacked 1,500 people in a population of 740,000; 80 per cent. of those stricken died. The districts Malang, Soerabaya, Kedri, and Madiden, which comprise the eastern part of the island, were invaded. The houses are constructed of bamboo. Rats live in the interior of the bamboo poles, and between the matting walls and partitions of the dwelling. The *Xenopsylla* is the common rat-flea. Another species, the *Pygiopsylla*, occurs, which will attack man after fasting for six days. Neither *Pulex irritans*, nor *P. serraticeps* were discovered on the Java rats. 35 fleas were counted on a rat which had been found dead on a bed, but they were not numerous as a rule.

Climatic conditions appeared to be without influence on the epidemic and the epizootic. Malang is surrounded with mountains, and communication with other districts could be stopped effectually. Isolation camps were pitched; sometimes whole villages were removed. Fleas in clothing were destroyed by formalin and ammonia vapour in a moist atmosphere. Rigorous isolation of pneumonic cases was enforced. The houses were rendered rat-proof by encasing the bamboo piles with zinc, and obliterating the cavities in the stem with concrete. The matting forming the walls was so hung that it might be easily removed. Rat destruction was energetically carried on; they were killed at the rate of 50,000 a day for some months. 40,073 prophylactic inoculations were given. Among those vaccinated, 155 cases and 123 deaths occurred from plague.

C. B.

Braddock (C. S.) [Jr.]. **Bubonic Plague, Seen at Close Range in the Far East. Some Random Notes.**—*New York Med. Jl.* 1912. Aug. 31. Vol. 96. No. 9. pp. 419–420.

On the eve of the author's arrival at Yokohama in the year 1902, plague broke out. Within 24 hours thousands of people were segregated, and a fence of corrugated iron embedded six inches into the ground was placed around a block of buildings, which were then burnt to the ground. At Korat (Siam) all of two hundred cases were bubonic; 193 died. Ten days later there was

an outbreak of pneumonic plague at Ban Phagi, two hundred miles away—22 cases all of which were fatal; none was of the bubonic type. The epidemic was not so severe in Siam as in China, since in the former the people live in the open air, whereas in China they reside in closed rooms. The Chinese isolate plague patients separately in temporary shelters. In the event of death the body is cremated by setting fire to the shed. At Petchaburi (Siam) the infected rat-fleas sought refuge on dogs. Many children died from plague contracted by fondling these animals. Braddock states that it is recorded that during the great plague of London households with dogs suffered most. He found that wearing shoes and stockings, and leggings saturated with ' coal oil ' was an effective preventive measure.

C. B.

LEPEUPLE (Dr.). **Un Cas de Peste Septicémique à Bord du "D'Iberville."**—*Arch. Méd. et Pharm. Nav.* 1912. Aug. Vol. 98. No. 8. pp. 138–143.

A case of septicaemic plague occurred on board the ship D'Iberville in August 1911, while she was cruising along the coast of Annam and Tonkin. It is probable that coolies employed in carrying out some repairs conveyed the infection. No dead rats were discovered. The whole crew, which consisted of 150 persons, received hypodermic injections of 10 cc. of anti-plague serum. All contacts were treated in a like manner. The ship was vacated and fumigated. No other case appeared.

C. B.

KLODNITZKY (N. N.). **Zur Frage der Entstehung und Verbreitung der Lungenpest.** [On the Origin and Spread of Pneumonic Plague.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1912. Aug. 24. Vol. 66. No. 1. pp. 49–59.

In the year 1894 the Russian physicians RESCHETNIKOW, BELAWSKY and RUDENKO observed cases which resembled pneumonic plague in the Transbaikal province of Siberia. Before this time, however, it was currently reported that a disease occurred which swept away whole families and was associated with great mortality in the rodents known as tarabagans. Small annual epidemics of plague broke out in the autumn, less frequently in the winter, among the Transbaikal population and that of the neighbouring parts of Mongolia. The semi-nomadic habits and paucity of the people limited these outbreaks, but on the construction of the railway the spread of plague was facilitated. In the year 1905 plague appeared at the colliery of Djalainor, 15-18 kilometres from the station Mandschuria on the railway line. The disease was confined to Cossacks; no Chinese were attacked. Annual outbreaks occurred in the period 1906-1909 at this station.

In 1910 the epidemic began in the Transbaikal province in September and advanced with great rapidity from Mandschuria along the line to Kharbin. In Kharbin and the neighbouring Chinese town, Fudjadjan, the native population were seized at

the rate of 150-200 a day. It was currently reported that the plague was connected with the greater activity displayed in hunting the tarabagan, caused by the considerable rise in the price of their skins. ZABOLOTNY and ISAEW discovered an infected tarabagan from which they isolated the plague bacillus. These outbreaks bear a certain analogy to those which have occurred almost every year since 1899 among the nomadic population of the Kirghis Steppes, where a marmot is a plague carrier. In both these areas the plague epidemics begin in the autumn or winter and are of the pneumonic type.

In the year 1910 Klodnitzky at the plague congress in Astrakhan advanced the view that the plague bacillus was conveyed in the food in some instances. He thought that the social and religious customs of the inhabitants of the Steppes had much to do with the spread of the disease. The neighbours and relations of the deceased take part in the ablution of the body which immediately precedes the funeral feast; hence infection may be conveyed through unwashed hands. Moreover, the custom of distributing the clothes of the dead prevails. At Saraitschikow in the Ural province 415 persons lost their lives from plague after the funeral of a wealthy Cossack, which about a hundred attended.

Klodnitzky states that the plague bacillus multiplies rapidly in bugs, in which it remains alive and virulent for three months. Though his attempts to transmit the infection from bugs to mice failed, he thinks that this insect may be a carrier.

C. B.

Epidémiologie et Prophylaxie de la Peste. (Exposé de Quelques Données Récentes.)—*Bull. Off. Internat. d'Hyg. Pub.* 1912. Sept. Vol. 4. No. 9. pp. 1592–1614.

More than 40,000 lives were lost in the epidemic of pneumonic plague which ravaged Manchuria from October 1910, to March 1911. In the middle of October 1910, 10,000 tarabagan hunters were congregated in Manchuli and Khailar on their homeward journey. There was an epizootic of plague among these marmots. It has been proved experimentally that the marmot during its winter sleep acts as a reservoir of the *B. pestis* (vide p. 68). It is at times carnivorous; hence it is possible that it may be infected by feeding on the corpses of those who have died of plague, since it has been ascertained that the *B. pestis* retains its vitality and virulence for a year in bodies interred in those parts where the marmot abounds (vide p. 70). The first case of plague occurred amongst these hunters at Manchuli on the 12th October 1910. The man had probably infected himself while skinning a diseased tarabagan.

At this time of the year the cold is very severe, the thermometer often registering 40° Centigrade below zero; hence the people throng together in small unventilated rooms for the sake of warmth. If agar plates are exposed in front of a pneumonic plague patient while he is talking or coughing, colonies of *B. pestis* appear on incubating at 37° C. Therefore it is seen that the infection was spread from man to man, rats playing no part

in its dissemination. Domestic animals contracted lung plague, and in a few instances they appeared to transmit it to human beings. Veils made of three-fold thicknesses of gauze afforded protection to the attendants on pneumonic plague patients. It is necessary that the veil worn by the patient should remain dry; if it becomes moist, it no longer arrests the passage of the droplets of sputum. Anti-plague inoculation, which is so effective in warding off bubonic plague, has not the same protective value in the pneumonic form. HAFFKINE vaccinated 132 people in the Kharbin Hospital with a mixture of his prophylactic and anti-plague serum; 22 died of plague; ten of these were tuberculous. FANG-CHIN reported that four deaths from lung plague occurred in 439 inoculated persons, KASAI eight in 2,832, BOGUSKI seven in 8,865. UYAMA inoculated 1,923 and WORRELL 80 people, who all escaped. Prophylactic injections of anti-plague serum averted plague in four out of five persons who had occupied the same room as a sufferer from pneumonic plague. It had no curative action on the disease however.

C. B.

SERUMS AND VACCINES.

TODD. **Plague Treated with Anti-Pest Serum.**—*Bull. Soc. Path. Exot.* 1912. July. Vol. 5. No. 7. pp. 459–462.

Thirteen cases of bubonic plague were treated with the Pasteur Institute anti-plague serum in the Bethesda Hospital, Canton. Six patients, who received intravenous and subcutaneous injections of about 100 cc. within the first twenty-four hours of their illness, recovered.

C. B.

FROST (Wade H.). **Active and Passive Immunization against Plague.** —*U.S. Public Health Rep.* 1912. Aug. 23. Vol. 27. No. 34. pp. 1361–1371.

The author thus describes the vaccines which have been employed for the production of active immunity against plague.—

1. HAFFKINE's prophylactic, which he states is a six-weeks' old broth culture of the *B. pestis*, incubated at 25° to 30° and sterilized by heating at 65° C. for one hour, after which 0·5 per cent. of phenol is added.

2. The German Plague Commission vaccine, which consisted of sterilized emulsions of agar cultures.

3. LUSTIG and GALEOTTI's powder, which is prepared by digesting one-day old agar cultures of the plague bacillus in 0·75 per cent. of sodium hydrate at 10° C. for 24 hours, filtering through paper, adding acetic acid to the filtrate, collecting and drying the precipitate.

4. FERMI and BANDI's vaccine which consists of the peritoneal exudate of guinea-pigs which have been inoculated with virulent plague bacilli. This is preserved for two days in the ice chest, incubated for 12 hours at 37° C. and then sterilized by heating to 52° C. on two successive days. The exudate is diluted with physiological saline fluid containing 0·5 per cent. phenol and 0·25 per cent. sodium carbonate.

5. SHIGA and BESREDKA employed emulsions of dead *B. pestis* grown on agar, mixed with anti-plague serum.

6. STRONG made use of suspensions of living plague cultures which had been attenuated by long subculture, or by growth on an unfavourable medium, obtained by the addition of alcohol or other chemical substances.

KOLLE and OTTO found that immunizing effects were produced in 45 per cent. of rats by living attenuated plague bacilli, in 22 per cent. by HAFFKINE's and the German Plague Commission's vaccines, and in 16 per cent. by LUSTIG and GALEOTTI's powder.

SHIGA and BESREDKA ascertained that the addition of the anti-plague serum rendered the local reaction less severe. Immunity was conferred rapidly on animals.

STRONG inoculated 42 criminals with living plague bacilli; some received whole agar cultures. No harm resulted, beyond local and general reactions. Immune bodies were afterwards detected in the blood of 24.

The serum of animals which have been immunised by the foregoing methods is used for conferring passive immunity and for serum therapy. It is difficult to standardize. Mice are the animals which show the protective value of the serum best. The passive immunity which is induced in monkeys, rats and guinea-pigs does not last longer than fourteen days, and is not constant during that period. Frost states that the prophylactic action of the serum is uncertain, as there are several instances in which plague has developed 12 to 20 days after its injection. He however advocates its administration to those who have been exposed to infection. Workers in plague laboratories should be inoculated with the HAFFKINE prophylactic every six months. The author says that he has not consulted the original papers to which he refers, except in a few instances. His references, moreover, are some years old.

C. B.

Annual Report of the Sanitary Commissioner with the Government of India for 1910.— 1912. Calcutta: Superintendent, Government Printing, India. p. 67.

Anti-plague Inoculation.—Sure proof of the efficacy of inoculation against plague was afforded by the continued immunity of the staff of the Bombay Plague Laboratory, comprising 116 persons. In connection with their work they were brought constantly into contact with plague-infected rats and fleas; yet they escaped infection, since they had been inoculated every year.

C. B.

BIONOMICS OF FLEAS AND RODENTS.

NICOLL (William). **On the Length of Life of the Rat-Flea apart from its Host.**—*Brit. Med. Jl.* 1912. Oct. 12. pp. 926–928, and Oct. 26. pp. 1097–1098.

Fleas (*Ceratophyllus fasciatus*) were taken from rats or rat cages, and were placed in small flasks, on the bottom of which was a thin layer of sterile sand. The flasks, plugged with cotton wool,

were kept at temperatures of 15°-23° C. in the summer, and 10°-17° C. in the winter.

He made 89 experiments, using 7 fleas in each.

The average length of life of *C. fasciatus* apart from its host is under seven days. Of 505 fleas 46 lived fourteen days or more, and 10 survived 21 days or longer. They live longer in winter than in summer. They may remain alive two months without feeding, if the temperature does not exceed 10° C. This period may be extended to ten weeks if they are kept in the ice-chest. Temperatures above 25° C. are injurious to them. They die within 24 hours when they are incubated at 37° C. Excess of dryness or of moisture is harmful to them. Exposure to bright daylight was rather more favourable to them than darkness or shade. Fleas which were removed from the cage were somewhat hardier than those captured from the rat.

The larval and pupal stages are greatly prolonged under certain conditions. The sweepings of a cage in which large numbers of fleas and their larvae were present were placed in a tall glass vessel. The material retained some of its moisture below, but became as dry as dust in its upper layers. Living fleas were observed in this vessel for more than twelve months. In two other experiments in which the sweepings were damp, the fleas disappeared in two months. The presence of larvae towards the close of the experiments suggested that the fleas bred in captivity under these unfavourable conditions. Under ordinary circumstances the rat-flea completes its developmental cycle in a fortnight or three weeks. In warm damp weather this may be shortened to ten days.

C. B.

Scholz (Dr. Fritz). **Probleme der Pest und der Pestbekämpfung.** [On Plague and its Prophylaxis.]—*Centralbl. f. Bakt.* 1 Abt. Orig. 1912. June 24. Vol. 64. Festschrift. f. Prof. Dr. Loeffler. pp. 44–52.

This paper reviews our present knowledge of plague. It is designed to bring about an alteration in the German laws for the prevention of plague, which need revision. Bubonic plague is spread through the agency of fleas; pneumonic plague infection is conveyed in the droplets of saliva and mucus. The author finds that fleas dislike the smell of coumarin, which kills them in 2 or 3 hours. Naphthalin and iodoform also are used for this purpose. In the Manchurian epidemic of pneumonic plague face masks afforded protection against infection; prophylactic inoculations failed. The author states that the incubation period of pneumonic plague is still doubtful. Simond thinks that it rarely exceeds 3 days. The Manchurian observers, however, consider that 7 to 9 days would be more correct. He draws attention to the important observations on the hibernation of the rat-flea, *Ceratophyllus fasciatus*, by Gauthier and Raybaud. It may remain alive without nourishment for 45 days, at the end of which plague bacilli may be recovered from it. This fact may explain the origin of outbreaks otherwise unaccountable.

C. B.

McCoy (George W.). **Notes on the Bionomics of Rats and Ground Squirrels.**—*U.S. Public Health Rep.* 1912. July 5. Vol. 27. No. 27. pp. 1068–1072.

The author states that there is no definite breeding season for rats (*Mus norvegicus*) in San Francisco. This accords with the Indian observations. Rats may survive five days' starvation. One, totally deprived of water, lived for 35 days on dry wheat. Fourteen were in good health at the end of 30 days, during which they had subsisted on bread, meat, cheese and carrots, without any water. Three lived for 60 days on bread, meat and cheese only. The breeding season of the squirrels is from February to April. They feed on grass and grain.

C. B.

Plague in Marmot and Spermophile.

Dujardin-Beaumetz (Ed.) and Mosny (E.). **Evolution de la Peste chez la Marmotte pendant l'Hibernation.**—*Compt. Rend. Acad. Sci.* 1912. July 22. Vol. 155. No. 4. pp. 329–332.

The marmot, *Arctomys marmota,* or the tarabagan, inhabits the mountains of eastern Siberia in great numbers. *Tcherkassoff remarked that tarabagan hunters were liable to a fatal illness; this is now recognised as plague. Transbaikalia and Mongolia appear to have been foci of plague from time immemorial. The authors searched for an explanation. The tarabagan in its normal state succumbs rapidly to the plague infection; but it was not known how it reacted to the bacillus during its winter sleep, when its temperature remains not more than two degrees higher than that of the air. They inoculated three hibernating tarabagans with *B. pestis.* One died two days later; the second survived 61 days, and the third 115 days. The bacillus was present in enormous numbers in all the bodies post mortem, although the temperature of the animal had not exceeded 8° Cent. No local reaction or glandular enlargement was caused. The tarabagan, therefore, forms a reservoir for the plague virus during its hibernation.

C. B.

Schurupoff (J. S.). **Ueber die Empfänglichkeit der Ziesel** (*Spermophilus guttatus*) **für die Bubonenpest.** [The Susceptibility of the Spermophile to Bubonic Plague.]—*Centralbl. f. Bakt.* 1 Abt. Orig. 1912. July 17. Vol. 65. Nos. 4–5. pp. 243–256.

The spermophile or ground-squirrel is a rodent of the family of *Sciuridae,* inhabiting eastern Europe, the Caucasus, northern Asia, and north America. It is about the size of a European squirrel. It causes great damage to crops wherever it is abundant. During the winter it hibernates. It thrives well in captivity, and is easily tamed. Experimental plague is readily induced in this rodent; it succumbs in 2 to 7 days. Three hours detention in a cage with infected animals is sufficient to excite the disease.

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* *Erinnerungen eines Jägers aus Ostsiberien* 1856, 1863. Leipzig 1864.

Schurupoff states that his experiments show that the infection is conveyed in food, or by inhaling infected dust, or through slight injuries. He does not appear to have investigated the ectoparasites of this animal.

C. B.

EXTERMINATION OF RODENTS.

RUCKER (Wm. Colby). (i.) **The Necessity for Rodent Extermination in American Seaports.**—*Jl. Amer. Med. Assoc.* 1912. July 27. Vol. 59. No. 4. pp. 243–244. (ii.) **The Eradication and Prevention of Bubonic Plague.**—*U.S. Public Health Rep.* 1912. July 19. Vol. 27. No. 29. pp. 1130–1142.

In America the ground squirrel (*Citellus beechyi*) does not live near houses, and rarely travels far. Though susceptible to plague, it does not transmit it directly to man; but it acts as a reservoir for the virus which infects the rat. In warehouses rats have been destroyed by suspending a bait between two overhead electric wires from which the insulation has been removed for a short distance. The rat shunts the current through its body, while crawling over these unprotected parts of the wires, and falls into a vessel of water below. Sulphur dioxide, carbon dioxide, carbon monoxide, or the funnel gases are valuable for the fumigation of ships. Concrete is the best rat-proofing material. Concrete foundations, basements, and floorings should be installed in houses, stables, warehouses and other places where food stuffs are stored. Galvanized iron is not so satisfactory. Guards must be placed to prevent rats ascending and gaining access to the building through doors, windows, ventilators, and the roof.

C. B.

RUCKER (W. C.). **How to Poison Rats.**—*U.S. Public Health Rep.* 1912. Aug. 9. Vol. 27. No. 32. pp. 1267–1268.

Rats do not object to the odour and taste of phosphorus. It is best incorporated with a glucose base, since it is then less liable to spontaneous combustion. This paste, containing 4 per cent. phosphorus, is spread on all sides of pieces of stale bread, one inch square by three-quarters of an inch thick. The bait is placed in the rat-holes, or if these are inaccessible in boxes closed on all sides, except for an aperture two inches in diameter which will admit rats but not domestic animals.

C. B.

LONG (John D.). **A Squirrel Destructor. An Efficient and Economical Method of Destroying Ground Squirrels.**—*U.S. Public Health Rep.* 1912. Sept. 27. Vol. 27. No. 39. pp. 1594–1596. With 7 figures.

The destruction of the American ground squirrel by laying down poisoned grain is effective in the dry months, July to October, only. Placing balls of cotton waste saturated with carbon disulphide in their burrows is unavailing in the hot weather, when the ground is parched and cracked.

Long has devised a vaporising pump with a hose and a receptacle of nine pints' capacity. The hose is inserted into the squirrel's burrow to the extent of a foot. The earth is pressed round it. Half an ounce of refined carbon disulphide is put into the vaporising chamber. Thirty strokes of the pump are given, which cause twelve cubic feet of a 1·5 per cent. carbon disulphide vapour to be driven into the hole. The hose is withdrawn and the burrow is sealed with earth. The animals make no effort to escape, become unconscious, and die in half to three-quarters of an hour. Forty burrows can be treated in this manner in an hour. The cost is less than in the case of other methods of destruction.

C. B.

Unclassed.

Schurupoff (J. S.). **Ueber die Vitalitätsdauer des Pestbacillus in Leichen an der Pest Vestorbener.** [The Vitality of the Plague Bacillus in the Corpses of Plague Patients].—*Centralbl. f. Bakt.* 1. Abt. Orig. 1912. July 17. Vol. 65. Nos. 4–5. pp. 225–243.

Plague has been epidemic in the Kirghiz Steppes for more than ten years, and has now extended to Astrakhan and the Ural district. It assumed the pneumonic form in the outbreaks of the years 1905, 1909, and 1910. Vokote investigated the vitality of the plague bacillus in the bodies of putrid mice. Klein ascertained that it was alive and virulent in the decomposing tissues of guinea-pigs which had been kept at various temperatures for 18 to 22 days after death. Maassen recovered the bacillus from dead rats which had been incubated at 18° C. for 20 days. Slatogoroff ascertained that the *B. pestis* survived only 5 days in the dead guinea-pig at 35° C., but that it lived for 109 days if the cadaver was frozen.

Schurupoff himself had observed that laboratory cultures seven years old were still living; hence it appeared probable that this micro-organism would continue to live in the human plague corpse. He exhumed 17 bodies of the victims of plague. They were in a state of good preservation, since the soil in which they were interred contains 20 per cent. of salt: moreover they became frozen in the winter. From six of them he recovered virulent plague bacilli, although they had been buried for a year in some instances. To induce the disease it was necessary to rub into a large shaven area of a guinea-pig's abdomen a considerable amount of the material from the cadaver.

C. B.

Manning (J. v. V.). **Bedbugs and Bubonic Plague.**—*Med. Record.* 1912. July 27. Vol. 82. No. 4. pp. 148–150.

The author draws attention to Verbitski's experiments on the transmission of plague by *Cimex lectularius*. These insects infected guinea-pigs by their bites for five days after feeding on

a plague animal. MARLATT* states that the bedbug can survive starvation for several months. It can live on moistened wood. The female deposits 6 to 50 white oval eggs grouped together in cracks and crevices. These hatch in a week or ten days. Maturity is attained in seven weeks. The bug is gregarious and nocturnal in its habits, effectually concealing itself during the day. A bait prepared by emulsifying mercury with egg-albumen is a destructive poison for them. Hydrocyanic acid or sulphur dioxide fumigation is useful.

C. B.

MATSUO (K.). **Gleichzeitiges plötzliches Auftreten von Pestfällen bei Menschen und bei Eseln in demselben Gehöft.** [Simultaneous Occurrence of Plague in Men and Donkeys in the same Homestead.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1912. Aug. 10. Vol. 65. No. 6–7. pp. 417–423. With 1 plate.

In the epidemic of pneumonic plague which prevailed in North Manchuria from October 1910 to April 1911, and caused the loss of 40,000 lives, donkeys also contracted the infection. Matsuo isolated virulent plague cultures from the lungs of one of these animals. It seems certain that in some instances the infection was conveyed to them directly from man. They appear to be able to transmit the disease again to man.

C. B.

HOSSACK (W. C.). **Some Comments on the Outbreak of Rat-plague in Suffolk and the Manchurian Epidemic of Human Plague.**—*Indian Med. Gaz.* 1912. July. Vol. 47. No. 7. pp. 259–262.

The author directs attention to cases in which the rat flea is not the carrier of the plague infection. The disease is sometimes an acute septicaemia which causes secondary pneumonia; hence the *B. pestis* may be conveyed directly from man to man. He refers to VERBITSKI's successful experiments with human fleas, and quotes WALKER, who reported an outbreak of nine cases of plague in Meiktila (Burma) in 1910. Bugs were plentiful, but no fleas were to be found. WALKER induced plague in a rat by causing it to be bitten by a bug which had fed on a plague patient.

C. B.

MERESHKOWSKY (S. S.). **Ein neuer Nährboden, auf dem der Bacillus Danysz selbst nach langandauernden, fortlaufenden Ueberimpfungen seine Virulenz nicht verliert.** [A New Medium on which the Bacillus of Danysz does not Lose its Virulence.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1912. July 17. Vol. 65. No. 4/5. pp. 393–399.

Danysz' bacillus, which is used for the destruction of rats, loses its virulence when it is grown on the usual media. MERESHKOWSKY finds that this property is retained if the bacillus is transplanted into a white of egg decoction. Hard-boiled white of egg

* MARLATT (C. L.). The Bedbug (*Cimex lectularius* Linn.)., *U.S. Dept. of Agricult., Division of Entomology—Circular* No. 47, 2nd Series. (Revised Edition.)

is finely minced and added to water in the proportion of 10 per cent. The fluid is autoclaved for five minutes, filtered, and again sterilised in test tubes. The tubes are incubated at 38° C. for 24 hours after inoculation, and are kept in a dark and cool place for two or three days when fresh inoculations must be made. 24-hour broth cultures from these are used to infect the bait for the rats. The 679th passage of Danysz' bacillus in this egg medium caused the death of rats, after eating food containing it, in 7 to 9 days.

C. B.

KING (Howard D.). **Plague: The Menace of the United States of America.**—*Jl. Amer. Med. Assoc.* 1912. July 27. Vol. 59. No. 4. pp. 237–242.

The author states that plague is prevalent at the present time along the western coast of South America, and in Costa Rica and Cuba. Since the salient feature in this pandemic is that it advances along the highway of commerce, he sounds a note of warning. The experience of San Francisco shows that it is possible to reduce effectually the number of rats in dwellings, warehouses, wharfs, and ships. He says that it is one of the most interesting sights on arrival at the Port of London to observe the red-uniformed band of rat-killers come on board and begin operations before the passengers have disembarked.

C. B.

PÖCH (Rudolf). **Zur gegenwärtigen Ausbreitung der chinesisch-indischen Pestepidemie.** [The Present Distribution of Plague.]—*Wien. Med. Wochensch.* 1912. Aug. 10. Vol. 62 No. 33. pp. 2190–2199.

This a popular account of the present pandemic. It is well written, and is easy reading. The author mentions many names, but gives no references; hence the article is not of great value to the specialist.

C. B.

MCCOY (George W.). **The Technique of the Laboratory Examination of Rats for Plague.**—*U.S. Public Health Rep.* 1912. July 26. Vol. 27. No. 30. pp. 1174–1187.

The rats are immersed in an antiseptic solution to destroy ecto-parasites. The skin is reflected from the whole of the front of the body in order to expose the cervical, axillary, and inguinal glands. Subcutaneous injection is usually the first sign to attract attention in the plague-rat. The discovery of a bubo is almost invariably diagnostic of plague. The gland affected is surrounded with a zone of congestion. It is most often caseous. The liver in the plague-rat is yellow and is studded with innumerable pin-head whitish granules. Sometimes the viscus presents an appearance as if it had been peppered. Danysz' virus causes a somewhat similar change; the granules however, are larger. The spleen is enlarged, congested and occasionally granular.

Bilateral, serous or blood-stained, pleural effusion is found in 72 per cent. of plague-rats. These lesions may be recognised in the cadaver after decomposition has set in. If on microscopic examination of smears of the bubo and spleen bipolar bacilli and coccoid forms are seen, it is probable that the organism is the *B. pestis.* The bipolar appearance of this microbe is dependent on the technique of staining; too great stress should not be placed on this character. In agar cultures it grows as a short rod, or often like a coccus. If this medium contains 3 per cent. sodium chloride, large balloon-shaped bodies, great cocci, and objects resembling enormous trypanosomes are encountered. Its stalactitic growth in streptococcus-like chains in broth is characteristic. Litmus milk and glucose broth are rendered slightly acid; lactose broth is unchanged. To test the pathogenicity of the suspected culture, a little of it is rubbed into a shaven area of about one inch square of the abdomen of a guinea-pig or white rat. *B. pestis,* when inoculated in this manner, kills the guinea-pig within seven days, and the rat rather sooner. The survival, after such inoculation, of animals which have been immunized with anti-plague serum will confirm the diagnosis.

C. B.

UNDULANT FEVER.*

Distribution, Etiologie et Prophylaxie de la Fièvre Ondulante.—*Bull. Off. Intern. d'Hyg. Pub.* 1912. July. Vol. 4. No. 7. pp. 1180–1211.

This interesting paper brings our knowledge of undulant fever up to July 1912, and concisely states the results of recent work; it does not, however, include NÈGRE and RAYNAUD's work on the differentiation of the *M. paramelitensis* infections (*v. infra*).

A long list of synonyms is given, the most recent ones being *Melitococcie* (WIDAL), *Melitensis septicaemia* (EYRE), *Fièvre capricieuse* (NICOLLE), *Fièvre caprine* (DANTEC). The history of the disease and the review of the geographical distribution which is given may be summed up in the statement—Undulant fever has passed out of its ancient habitat, has radiated from the Mediterranean coasts to the interior of the continents, and is now to be found in every part of the world.

The only patricular point in the symptomatology that need be referred to is the high mononuclear increase found (70 to 80 per cent. NICOLLE). [This increase was usually found in cachectic sailors at Haslar when the disease was so common there, and attention was drawn to it by the reviewer. MENSE's *Handbuch der Tropenkrankheiten.*] CANTALOUBE gives the duration of the disease as six months.

In the Epidemiological section a useful table is given of the percentage of infected goats in different localities.

Authors.	Place.	Per cent. of goats infected.
Zammit...	Malta	50
Sergent...	Algeria	3·4
Nicolle...	Tunis	30·7
Conor & Huon... ...	Marseilles... ...	34·2
Aubert & Cantaloube...	St. Martial (Gard)	29·0

Mules, asses, horses, oxen, cows, rabbits, and fowls, besides goats, appear capable of propagating the disease (SERGENT). At Messina, of 70 oxen five were infected and of 40 cows five also. Rabbits can easily be infected by massive laboratory doses of *M. melitensis*, but not in small doses by the mouth or skin or by contact (CONOR); these animals appear to produce antibodies, but are not generally infective.

Four modes of infection are noted.—1. By the digestive system (the most common). 2. By the respiratory system (very rare). 3. By the cutaneous surface, in accidental or purposeful inoculations, or by insects (possible but negligible). 4. By the mucous surfaces, husband to wife and by prostitutes (possible).

Bacteriology.—The organism is described as a cocco-bacillus, having considerable vitality in urine, milk, and water. It produces a toxin which acts as a haemolysin (FIORENTINI), agglutinins which may last 4 to 10 years (ROGER), and specific serum useful for immunization (SICRE).

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* This name will be used in this journal in preference to Malta or Mediterranean fever.

TRAMBUSTI and DONZELLO have used a nucleo-proteid vaccine with encouraging results, and dead bacterial vaccines have been sometimes effective (BASSETT-SMITH). SERGENT states that the practical value of serum therapy and vaccination against the virus of undulant fever has not been demonstrated.

Bacterial diagnosis comes under two headings: (1) Sero-reactions, a method which is considered trustworthy in spite of EUZIÈRE and ROGER's conclusions, (2) Haemo-culture, a very good but slower method.

The prophylactic measures recommended are, (1) Collective: Notification, isolation, disinfection, sterilizing milk and water, and good hygiene. (2) Individual: Cleanliness, prevention of infection from mother to child, etc. (3) Veterinary measures: Prevention of the importation of infected animals, observation of animals, inspection of stables, etc.

The general immunisation of goats against the fever is recommended (SIMOND). This is now being done with success by VINCENT and COLLIGNON.

The extension of the disease makes all measures of prophylaxis very important if its spread is to be controlled, but this is difficult. Some interesting copies of decrees which were issued at Tunis and in Algeria are added and a very good bibliography.

P. W. Bassett-Smith.

SERO-DIAGNOSIS.

NÈGRE (L.) et RAYNAUD (M.). (i.) **Etude de l'Agglutinabilité de Différentes Races de *M. melitensis*.**—*Compt. Rend. Soc. Biol.* 1912. May 3. Vol. 72. No. 15. pp. 664–665. (ii.) **Melitensis et Paramelitensis.**—*Ibid.* May 24. No. 18. pp. 791–793. (iii.) **Identification des Paramelitensis par l'Epreuve de la Saturation des Agglutinines.**—*Ibid.* July 5. No. 24. pp. 1052–1054.

i. This paper was written in reply to some articles by SOULIÉ, EUZIÈRE and ROGER. Experiments were carried out with five strains of *M. melitensis* obtained from Malta, Algeria, and Tunis. Emulsions were made from four day old cultures and 37 serums were tested before and after heating to 56° C. for half an hour; the results were observed microscopically, in a dilution of 1/10, after five hours at room temperature.

Strain.	Number of serums agglutinated. Before heating.	After heating.
1	27	4
2	26	4
3	4	4
4	4	4
5	4	4

The authors found that certain strains were very easily agglutinated, not only by undulant fever serum, but by serum from patients with other diseases, and that some strains only reacted in very low dilutions with undulant fever serum. They express the view that these observations explain the very different and

sometimes disconcerting results of other authors, and they strongly advocate heating the serum before use.

ii. Having shown in previous papers that certain strains of *M. melitensis* agglutinated with serum of cases of undulant fever in dilutions from 1/300 to 1/5000, both heated and unheated, they obtained a sixth strain (Br.) from Dr. C. Nicolle in Tunis. This organism was culturally and morphologically identical with the other strains, but differed in its agglutinative properties. When tested with ten heated serums of cases suffering from the fever, it never agglutinated in a higher dilution than 1/50, which was only about a tenth of that of the other strains. A rabbit was immunised, and confirmatory results were obtained with its serum. Strain Br. was agglutinated up to 1/500 by its own anti-serum, but only up to 1/50 by other specific serums, while the other five strains were only slightly agglutinated with the serum produced by the Br. strain.

Similar agglutinative characters have been considered sufficiently distinctive to separate a *B. para-dysentericus* from *B. dysentericus*, and *para-meningococcus* from the true *meningococcus;* the formation of a *paramelitensis* group, therefore, is justifiable.

iii. A continuation of these experiments. Further proof of the distinctive character of the *paramelitensis* strain was obtained by a series of agglutinin absorption experiments.

(1) A rabbit was immunised with strain No. 1; the serum in a dilution of 1/10 was tested with an emulsion of strain No. 2; after 24 hours contact the sediment was removed and the clear diluted serum was tested with the five remaining strains; there was no agglutination with any of them; all the specific agglutinins had been removed.

(2) A dilution of the rabbit's serum was made as before and tested with an emulsion of strain Br.; the clear serum was after 24 hours tested with the other strains; they all agglutinated up to 1/100, that is to say, strain Br. (*M. paramelitensis*) had not removed all the agglutinins for the *M. melitensis*.

A second series of experiments was carried out, a rabbit being immunised with the *M. paramelitensis;* the results confirmed those of the first series.

The authors conclude that these agglutinin absorption experiments differentiate this organism from the five other strains, and justify the formation of a *M. paramelitensis* group.

P. W. B.-S.

Nicolle (C.) and Conor (A.). **Sur la Valeur du Sérodiagnostic de la Fièvre Méditerranéenne.**—*Arch. Inst. Pasteur Tunis.* 1912. No. 3. pp. 136–139.

The authors draw attention to the frequent errors that have resulted, even in their own laboratory, from sero-diagnostic reactions for undulant fever. They point out how the recent work of Nègre and Raynaud has provided an explanation

of these errors, and has suggested methods to avoid them. They demonstrate the importance of removing the serum from the clot, if the blood is not to be examined at once; for after long contact with the clot the serum loses a great part of its agglutinative properties. The most common error, however, is the positive reaction obtained with non-undulant fever serum. By heating the serum to 56° C. for half an hour, the non-specific agglutinins are destroyed, leaving intact the specific agglutinins. They state that, by this simple modification, the value of the serum reaction in undulant fever is made certain. The use of a culture of *M. paramelitensis* is also a fruitful source of error, as shown by Nègre and Raynaud. They note the curious circumstance that, though the strain Br. (*M. paramelitensis*) was isolated by Bruce, not until many years after was it recognised in the laboratory at Algiers as being a distinct organism; moreover, this strain has been widely distributed to other laboratories in Europe, thus causing many of the contradictory agglutinations which have thrown such doubts upon the value of the test.

They conclude by emphasising the specificity of the test for undulant fever when proper precautions are taken, and point out that we must recognise as distinct *M. paramelitensis*, causing a para-undulant fever.

P. W. B.-S.

Missiroli (Alberto). **La Fissazione del Complemento nella Febbre Mediterranea.** [Complement Fixation in Mediterranean Fever.] —*Policlinico.* Sez. medica. 1912. Sept. Vol. 19. No. 9. pp. 414–421.

In a previous paper the author demonstrated that some strains of *M. melitensis* will agglutinate with high dilutions of normal blood. In this paper he gives the results of some further experiments, both with the agglutination and complement fixation tests. For the Bordet-Gengou reaction he used two strains of the *M. melitensis*, one from Pisa and one from Krahl. That from Pisa was of little value; the Krahl strain, however, gave definite and satisfactory results, even in some cases in which the agglutination test failed. 42 serums were examined (in dilutions from 1 : 10 to 1 : 1000) for agglutination, and also for complement fixation. From his experiments he draws the following conclusions.—1. The blood of a case of Mediterranean fever contains an immune body suitable for complement fixation. 2. Contrary to what is affirmed by Sicre, these antibodies are not fixed equally well by all strains of *M. melitensis*. 3. In accordance with the views of Pulvirenti and contrary to those of Sicre, the quantity of immune body corresponds with the quantity of the agglutinins. 4. The method of complement fixation has very little advantage over the agglutination test from a diagnostic point of view, particularly as different strains used as antigen give very divergent results.

P. W. B.-S.

Undulant Fever in South Africa.

i. Brown (G. Minter). **Notes on Two Peculiar Cases of Malta Fever.**—*S. African Med. Rec.* 1912. July 13. Vol. 10. No. 13. pp. 275–276.

ii. Roberts (C. Dudley). **Notes on Three Cases of Malta Fever.**—*Ibid.* Aug. 10. No. 15. pp. 321–322.

iii. Strachan (P. D.). **Haemorrhage from the Bowel in Malta Fever.**—*Ibid.* Aug. 24. No. 16. pp. 346–347.

iv. Muir (John). **Haemorrhage from Bowel in Malta Fever.**—*Ibid.* Oct. 12. No. 19. p. 423.

i. Two cases of doubtful undulant fever are recorded from the Transvaal by Brown. In one there was severe haemorrhage into the bowel and both ended fatally. The symptoms do not suggest a diagnosis of this fever. In one case only was a sero-diagnostic test made, and then from blood collected after death.

ii. Roberts gives details of three cases of fever attended with severe haemorrhage, which were under treatment in Kimberley Hospital. On post mortem examination, the first two cases showed suppurative conditions in the hepatic region, but no evidence of dysentery. The third case clinically resembled typhoid; about ten days before death the patient commenced to have intestinal haemorrhages, and at the post mortem ulcerations of the colon, cæcum, and small intestine were found. All these cases, one in a dilution as high as 1:200, gave positive serum reactions with the *M. melitensis.*

iii. Strachan, commenting on the above cases, points out that in undulant fever in Europe such severe haemorrhages have never been recorded, nor have they been observed by Garrow and himself during their large experience of the disease in South Africa. He draws attention to the fact that positive agglutinative reactions may, in some cases, continue for years after an attack, and therefore a positive reaction does not always mean a present infection. He states, however, that it is possible there may be some factor in the environment, or habits of life, of the people about Kimberley which tends to intensify the congestion said to be present in the alimentary canal during an attack of undulant fever.

iv. Muir records a case of continued fever, associated with diarrhœa and vomiting, in an adult near Cape Town; death occurred from the effects of a haemorrhage from the bowel about the 24th day. The blood was tested in the Public Health Laboratory at Cape Town and gave a positive reaction with *M. melitensis.*

[Haemorrhages of any extent are practically unknown in the European forms of undulant fever, and in some of these cases very marked pathological lesions were present which are quite distinct from those usually found in that disease. In others, *e.g.*, Muir's (the symptoms of which suggest typhoid) the man may have had a previous undulant fever infection. Bearing in mind the frequent errors that have occurred from serum diagnosis reactions,

taken alone, further proof of the presence of the *M. melitensis* is requisite before accepting the diagnosis of undulant fever.]

P. W. B.-S.

MUIR (J.). **Malta Fever in the Goat: a Veterinary Note.**—*S. African Med. Rec.* 1912. Sept. 14. Vol. 10. No. 17. pp. 372–373.

The author gives some notes showing the co-incidence of disease in goats, due to the *M. melitensis*, and in the country people employing them. He describes the way in which many herds are affected in South Africa, the goats having marked arthritic symptoms; and he draws attention to the important fact that these infected goats are widely dispersed in the country at the stock fairs.

P. W. B.-S.

TREATMENT.

NATALE (Salvatore). **Contributo alla Terapia della Febbre Mediterranea col Siero Trambusti-Donzello.** [The Treatment of Mediterranean Fever with Trambusti-Donzello Serum.]—*Policlinico.* Sez. pratica. 1912. June 30. Vol. 19. No. 27. p. 983.

This article communicates the results obtained by the use of Trambusti-Donzello's anti-*melitensis* serum in undulant fever cases. Case 1—An infant suffering from a typical remittent type of fever giving a positive (1 : 500) serum reaction was treated with 10 cc. of the serum, repeated in 24 hours; after three days the child recovered. Case 2, aged 25 years, suffered from an intermittent type of fever, with enlarged spleen. Quinine was not effective, and a positive serum reaction with *M. melitensis* was obtained. After injections of anti-serum the patient made a rapid recovery. Case 3—A lady suffering from a mixed infection of undulant fever and tuberculosis. A positive serum reaction (1 : 80) was obtained. The anti-serum was given, after which the fever underwent a marked modification, the temperature falling from 40°·7 C. to 36° C. and then running an irregular course; later an inflammatory focus was found under the left scapula, and this responded to tuberculin injections. Though the serum therapy in the last case was not successful, as was natural in a mixed infection, yet it was considered to have been beneficial, and to have given the anti-tubercular treatment a better chance.

[As anti-melitensis serums have not been successful in other hands, we look forward to the results of further experience with this serum.]

P. W. B.-S.

UNCLASSED.

LUNA (Francesco). **Contributo alla Conoscenza della Febbre Mediterranea nei Lattanti.** [Mediterranean Fever in Sucklings.]—*Riforma Medica.* 1912. June 15. Vol. 28. No. 24. pp. 646–647.

The author describes three cases of undulant fever at Palermo in infants at the breast. He states that such cases have been

but little studied, and that probably many are never recognised. The symptoms are not distinctive. From the blood counts, which are given, it is not possible to draw any deductions, as the variations are so great in children.

The agglutination was positive at 1:1000 (twice) and 1:200.

P. W. B.-S.

VÉLEZ (L. R.). **La Fièvre de Malta existe au Pérou.** [Correspondance.]—*Bull. Soc. Path. Exot.* 1912. July. Vol. 5. No. 7. p. 454.

The author makes a short statement that in the valley of Chicama, Peru, he diagnosed undulant fever by cultural methods and sero-diagnostic reactions. In 1909 Dr. BARTON at Lima attributed a number of infective fevers in infants to this cause.

P. W. B.-S.

BARRÉ (Emile). **Les Complications Hépatique de la Fièvre de Malte.**—Université de Montpellier. Faculté de Médecine. *Thèse.* No. 63. 1912. July 4. 35 pp. Montpellier. Imprimerie Coopérative Ouvrière.

In this thesis are discussed the hepatic complications rarely found in the course of undulant fever. The author quotes fully cases described by LAGRIFFOUL and ROGER, RAUZIER and ROGER, EYRE and FAWCETT, and others.

P. W. B.-S.

MISSIROLI (Alberto). **Influenza dei Portatori di Germi nella Diffusione della Febbre Mediterranea.** [The Influence of Carriers in Diffusion of the Germ of Mediterranean Fever.] *Riforma Medica.* 1912. Aug. 10. Vol. 28. No. 32. pp. 869–874. With 5 charts.

In 1892 GAFFKY proved the existence of carriers of cholera during the epidemic at Hamburg. SHAW drew attention to the same danger in the case of undulant fever in Malta. Epidemics have occurred elsewhere in which the disease could not be traced to infected goat's milk. The author describes an epidemic of undulant fever which continued to spread after prophylactic measures with regard to milk etc. had been taken. The blood of twenty apparently healthy men was examined. Of these four gave positive agglutination reactions (1/10—1/1000). In one the *M. melitensis* was isolated from the blood; five days afterwards a slight fever set in, with the usual symptoms of undulant fever in 15 days.

[The detection of these carriers or ambulant cases is important because they may act as centres of infection, producing epidemics in an endemic area.]

P. W. B.-S.

i. LEGER (Marcel) et DOMINICI-URBANI (Ch.). **Foyer de Mélitococcie en Corse.**—*Bull. Soc. Path. Exot.* 1912. Oct. Vol. 5. No. 8. pp. 657–667.

ii. ZUCCARELLI. **Fièvre Méditerranéenne en Corse.** [Correspondance.]—*Ibid.* pp. 566–567.

i. The authors give an interesting description of an epidemic of undulant fever in Corsica. Sporadic cases were first noted in 1910 by BOURGUET. The disease is most commonly met with in that prosperous part of the island around Bastia where a large export trade of milk, cheese, etc. exists. Milk is undoubtedly the commonest means of infection, but DARBOIS has shown that cheese made of contaminated milk may be infective for three weeks. Twenty-six cases were observed, 18 of which were in women. Sero-diagnostic tests were applied to all; three strains of the *M. melitensis*, living and dead, were used. Differences in the results of the three were noted, and paradoxical reactions occurred. The goats, owing to deficiency of pasture, are at certain seasons allowed to mix together, and thus infection is spread from one herd to another. In the autumn of 1911 it was noticed that many of the goats showed signs of illness; mammitis and abortions were common.

The authors describe vividly the seriousness of the conditions observed at one of their visits to a herd of animals. Several of the flock were affected, the sheep dog was extremely ill, and the shepherd also had the fever. Of the herd of 200 goats, the blood of 35 gave 22 positive reactions, as did that of the dog and the shepherd. There is a definite connection between the endemic in the goats and that of the peasants. Nearly all those affected were working with the goats, but the authors state that three times within their knowledge the infection was inter-human, conveyed by dirty hands—not by ingestion of infected milk.

ii. Zuccarelli draws attention to the increasing evidence of the presence of infected goats and people in Corsica, and strongly advocates that measures should be taken, similar to those in Algeria, to prevent importation of infected goats, and the sale of milk from animals already diseased, with notification of all cases of disease in the island, etc.

P. W. B.-S.

FILARIASIS.

Tropical Africa.

Thiroux (A.). **Les Filaires Embryonnaires du Sang des Indigènes de l'Afrique Occidentale Française.**—*Bull. Soc. Path. Exot.* 1912. June. Vol. 5. No. 6. pp. 438–445. With a map.

The natives examined were soldiers from different parts of French West Africa. The author examined the blood in a fresh state direct and after centrifuging. As regards filarial periodicity in these districts he found that it was very badly marked in the case of *Filaria nocturna*: for example, in 44 per cent. of the cases this filaria was observed indifferently during the day and night, in 42 per cent. of the cases it was seen only at night, whilst finally in 13 per cent. in which no embryos had been found by a simple examination during the night, they were, nevertheless, discovered during the day, but only after the blood had been centrifuged twice. In some cases of *Filaria perstans* there seemed to be a tendency to a nocturnal periodicity and sometimes these embryos were found by a direct examination at night, even though they had not been discovered in blood which had been twice centrifuged during the day. The morphological characters of the filariae found closely resemble those described by other authors. The geographical distribution of *F. nocturna*, *F. perstans* and *F. diurna* in the districts under discussion showed that the two former were very common while the latter was rare. The rarity of *Filaria diurna* corresponded closely with a similar rarity of *Filaria loa*. This parasite would seem to diminish rapidly in frequency as one proceeds north Prout, for example, never having found it in Sierra Leone except in two natives who had come from the Congo.

G. C. Low.

Cazanove (Dr.). **Considérations sur la Filariose dans le Bataillon des Troupes Noires d'Algérie (1910–1911).**—*Ann. d'Hyg. et Med. Colon.* 1912. July–Aug.–Sept. Vol. 5. No. 3. pp. 555–593.

The author gives some interesting statistics regarding the prevalence of filariasis in a battalion of black troops employed in Algeria. These natives had been recruited from different parts of French West Africa, namely from Mauretania, Upper Senegal and Niger, Casamance and Upper Gambia, Guinea, Ivory Coast, and Equatorial Africa. The percentage infected is seen below.

Companies.	Number of men examined.	Number with filariae.	Per cent.	Occurring in the blood		
				Day and night.	Day alone.	Night alone.
1st company	187	58	31·01	13	2	43
2nd ,,	186	57	30·64	9	2	46
3rd ,,	190	49	25·79	16	1	32
4th ,,	191	64	33·50	15	3	46
Total ...	754	228	30·24			

Day and night examinations further revealed the fact that embryos with a purely diurnal periodicity were rare; in the vast majority of cases they occurred in the blood by day and night or by night alone.

The results of the examination of the wives and other females attached to the troops are striking, as they give a much lower rate of infection than for the men.

Companies.	Number of women examined.	Number with filariae.	Per cent.
1st company	112	14	12·5
2nd "	76	8	10
3rd "	85	10	12·7
4th "	78	10	12·8

Looking at the subject from the geographical point of view, the following are the percentages of infection in the different areas from which the men came:—

	Per cent.
Upper Senegal and Niger (région saharienne)	31·34
Mauretania	32·61
Upper Senegal and Niger (région soudanaise)...	33·02
Upper Senegal and Niger (région sahélienne)...	35·07
Guinea	38·40
Casamance, Upper Gambia	45·28
Ivory Coast	48·64
Congo	71·05

The manner in which infection takes place is next discussed and finally the physical state of those affected. The author sums up his researches in the following general conclusions:—

1. According to the statistics about one third of the men in a battalion of Senegalese soldiers, formed in 1910, are infected with filariae.

2. All the districts of French West Africa and French Equatorial Africa are prone to such infections, differing to some extent but fairly comparable.

3. The direct inoculation of the filaria by the puncture of mosquitos does not appear to him to be the only method of infection.

4. The presence of the filariae in the blood of the Senegalese soldiers did not appear sensibly to influence them in their fitness for service.

[The specific names of the filariae found are not mentioned in the paper, but it seems probable from the text that the infections were chiefly due to *Filaria bancrofti* and that in some instances the parasite did not appear to have any definite periodicity. Unfortunately many of the soldiers had served on the Congo and other areas where *Filaria perstans* is found; the possibility of some of them being infected with this parasite is of course very strong and cannot be overlooked in estimating the value of Cazanove's work.]

G. C. L.

LEGER (André). **La Filariose Humaine dans le Haut-Sénégal et Niger. Index Endémique de la Région de Bamako.**—*Bull. Soc. Path. Exot.* 1912. Oct. Vol. 5. No. 8. pp. 618–622.

Leger gives the endemic index of filariasis among the indigenes in the region of Bamako in the Upper Senegal and Niger district; it was found to be high. The embryos most frequently met with were *Filaria perstans* and *F. bancrofti*. *F. diurna* on the contrary was very rare, the percentage being of little importance.

Animal filariae were equally prevalent, embryos being found in the blood of calves, dogs, hyaenas and in a large proportion of birds.

The following tables, compiled by Leger, show the percentages of the different filariae at a glance:—

Table 1. Filarial Index during the rainy season (Adults).

Number examined.		Number with Filariae.					
		F. bancrofti.	Per cent.	*F. diurna.*	Per cent.	*F. perstans.*	Per cent.
953	A. Examined at midnight, 428.	61	14·25	0	0	54	12·38
	B. Examined at mid-day, 525.	0	0	4	0·75	57	10·80

Table 2. Filarial Index during the dry season (Adults).

Number examined.		Number with Filariae.					
		F. bancrofti.	Per cent.	*F. diurna.*	Per cent.	*F. perstans.*	Per cent.
725	A. Examined at midnight, 309.	35	11·30	0	0	42	13·55
	B. Examined at mid-day, 416.	0	0	2	0·48	39	9·38

Table 3. Filarial Index for children from eight to fifteen years.

Number examined.		Number with Filariae.					
		F. bancr fti.	Per cent.	*F. diurna.*	Per cent.	*F. perstans.*	Per cent.
315	A. Examined at midnight, 187.	7	3·73	0	0	15	8·02
	B. Examined at mid-day, 128.	0	0	0	0	6	4·68

G. C. L.

VERDUN (P.) and BRUYANT (L.). **Quelques Documents pour Servir à l'Étude de la Filaire loa.**—*Bull. Soc. Path. Exot.* 1912. July. Vol. 5. No. 7. pp. 506–508.

The authors state that the duration of the development of *Filaria loa*, its longevity, and the progress of the symptoms it produces are still by no means clear; they therefore report the following case, as helping to throw light on some of these points.

A young man went out to the West Coast of Africa and stayed a year and fifteen days (February, 1907, to March, 1908) near Bangui on the Upper Oubangui. Blackwater fever developed and he returned to France in July, 1908. The first manifestations of filariasis showed themselves about the middle of the following month when a pruriginous oedema of the penis appeared, lasting for three or four days. This symptom disappeared but recurred at intervals up to the end of October, to be followed later by evanescent swelling of the front and insides of the thighs.

In July-August, 1909, the site of the oedema changed, fugitive itchy swellings appearing on the back, the upper arm, the wrists and hands. The general state remained good. In the autumn of 1909 ocular troubles appeared for the first time, the patient having a sensation of something moving near his right eye, and these sensations becoming more troublesome, in the following year (1910) he consulted an oculist who removed a male adult *Filaria loa*. Before this operation the authors examined the patient's blood and found a very pronounced eosinophilia. In very numerous blood examinations but one microfilaria was seen, all others being negative.

The authors state that the period of incubation, from the time of infection by *F. loa* to the appearance of the first symptoms, is generally regarded as a long one, even up to thirteen years. In this case the minimum period was five months, the maximum seventeen, giving an average of eleven months, a period corresponding to figures given by WARD. As regards the development of the filaria this again is said to take a very long time, but in the case above quoted an adult male worm was extracted twenty-two months after the first skin swellings had been seen. A high eosinophilia persisted after this, indicating the presence of other adult forms either under the skin or in the deeper parts of the body.

The authors explain the practical absence of embryos by suggesting that the number of females was small, or that these were for the most part immature, or that they were not fertilised at the moment of examination.

[It is doubtful whether any of these explanations will suffice. The absence of embryos in definite *Filaria loa* infections is by no means uncommon, and it almost looks as if the authors' was a case of this kind, the finding of only a single embryo suggesting the possibility of some error in diagnosis.]

G. C. L.

South Sea Islands.

Fülleborn (F.). **Über Mikrofilarien des Menschen im deutschen Südsee-Gebiet und deren "Turnus," nebst Bemerkungen über die klinischen Manifestationen der dortigen Filariasis.** [The Human Microfilariae of the German South Sea Islands and their Periodicity, with Remarks on the Clinical Symptoms.]—*Arch. f. Schiffs u. Trop. Hyg.* 1912. Aug. Vol. 16. No. 16. pp. 533–547. With a map.

The author refers to the presence of embryonic filariae in the Pacific Islands with and without nocturnal periodicity. These cannot be differentiated by a comparison of their minute anatomy and body proportions, and, as Bahr and Leiper have pointed out, the adult worms of the non-periodic Fijian microfilariae are identical anatomically with specimens of *Filaria bancrofti* from other parts of the world. It would appear then that there are two biological varieties of *F. bancrofti*, one producing young with no periodicity, the other young with a nocturnal periodicity. The question is complicated and the author refers to the theories of Thorpe and Bahr which have been brought forward to explain it. Thorpe's idea was that the embryos were found in the peripheral blood both by day and by night on account of the irregular habits of the people, Bahr's that their presence by day might be explained by the fact that their chief intermediate host, at least for Fiji, is a day feeding mosquito, *Stegomyia pseudoscutellaris*.

The author made use of an excellent opportunity to prove or disprove the first of these views. He was allowed to examine the blood of a troop of Samoan natives appearing at the Zoological Gardens at Hamburg and found that about half had filarial embryos, identical with those of *F. bancrofti*, in their blood. These were found in almost equal numbers by day and by night, and this state of affairs persisted when the persons infected slept peacefully all night which previously they had been unable to do. This therefore does away with the idea of irregularities in sleep having anything to do with the altered periodicity. Of these Samoans the sexes were equally infected; the youngest child with positive blood findings was four years of age.

During the South Sea expedition of the "Hamburgische Wissenschaftliche Stiftung 1908/09" Fülleborn had an opportunity of examining the blood of natives in some of the islands of the Bismarck Archipelago and German New Guinea. 400 specimens of blood taken according to the thick film method were obtained. These examinations showed that a very high percentage of the inhabitants were infected with filariasis (*Filaria bancrofti*) and that the larval or embryonic forms of these areas, in contradistinction to those of Samoa, Fiji and other places, possessed a well marked nocturnal periodicity.

A similar state of affairs was found in Amboina and Celebes, namely embryos with a nocturnal periodicity, while in Ponape and Yap (Caroline Is.) in a very limited number of examinations no embryos were found.

Fülleborn now believes that after the work of Bahr in Fiji there should no longer be any doubt about the connection between filariasis and elephantiasis. Elephantiasis of the lower extremities and filarial glands, he says, occur in the islands of the Bismarck Archipelago and in German New Guinea and in many places are very frequent. He did not see cases in which the upper arms were affected. In other parts he did not meet with the disease at all, even although a marked *bancrofti* infection existed. Enlargements of the inguinal glands were very common especially in Singor and Bo, two places on the Maclay coast of German New Guinea. These glands were not hard as a rule, but formed soft masses (varicose groin glands); they were met with in eleven out of twenty-five people examined.

[This paper is very interesting, for it extends our knowledge of the habits of the filariae in the different Pacific Islands. The irregularity of periodicity in Samoa and Fiji has long been known and it is possible, as Bahr thinks, that the fact of the chief intermediate host being a day feeding mosquito may have something to do with this peculiarity. It would be interesting to determine the intermediate host in the Bismarck Archipelago and German New Guinea where, as Fülleborn has shown, a nocturnal periodicity exists. Fülleborn's blood examinations are perhaps rather few to draw definite conclusions from and extended observations may easily modify some of his results. Very probably cases of infection will be found in Ponape and Yap, and elephantiasis patients in the areas where he describes heavy infections with *bancrofti* larvae. Already in a subnote to his paper he states that elephantiasis of the breast occurs in German New Guinea, Dr. Dempwolff having sent him a photograph of such a patient.]

G. C. L.

Unclassed.

Fülleborn (F.). **Untersuchungen über Filarien.** [Researches on Filariae.]—*Beihefte zum Arch. f. Schiffs- u. Trop. Hyg.* 1912. May. Vol. 16. Beiheft 4. pp. 153–154 [439–440].

The author believes that the common distinction between the embryos of *F. bancrofti* and *F. loa* (*diurna*), according to the way they become stretched out in dried films, is not reliable because in the damp night air of the tropics microfilariae of the *bancrofti* type can take up similar attitudes to those of *diurna*. A good means of discriminating between the two, according to the author, is the position of the last nuclei at the tail end when treated with prolonged haematoxylin staining. In *diurna* these extend to the extreme end of the tail; in *bancrofti* only to 95 per cent. of the length of the worm. Better than this however is Rodenwaldt's method of vital staining with Azur II; or the usual dried smears may be stained with Azur II and then differentiated with glycerin ether mixture. Again, good results can be obtained by this last-mentioned technique, especially if the smears are fixed when in a wet state by hot alcohol as recommended by Looss. The vital staining procedure clearly shows

that the so-called *Filaria diurna* embryos are absolutely identical with those of *Filaria loa.*

Another interesting piece of filarial work is the experiment of inoculating blood rich in filarial embryos into uninfected animals. Such an experiment by GRUBY has shown that dog microfilariae have remained alive in the lungs for at least three years. During this time they increased considerably in size, but they did not show any of the developmental changes which take place in the Malpighian tubes of the mosquito.

Experiments suggested by the good results WELLMAN has obtained in chyluria by the use of the X rays were carried out by Fülleborn on dogs. The rays seemed to have a prejudicial effect on the sexual forms of the *Filaria immitis* in the dog's heart, but owing to the scarcity of the material the results cannot be taken as conclusive and the work will have to be repeated.

G. C. L.

FÜLLEBORN (F.). **Untersuchungen über die chemotaktische Wirkung der Malpighischen Gefässe von Stechmücken auf Hundemikrofilarien.** [The Chemotactic Action of the Malpighian Vessels of Mosquitoes on the Microfilaria of the Dog.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1912. July 17. Vol. 65. Nos. 4–5. pp. 349–352.

The author conducted an interesting experiment to determine whether the Malpighian tubes of the mosquito have any chemotactic action on the embryonic filariae of the dog. A large drop of blood, heavily infected with microfilariae, was put on a slide and the open ends of two capillary tubes—one filled with pure salt solution 4 per cent., the other with salt solution and crushed Malpighian tubes from a mosquito (*Anopheles maculipennis*) —were inserted into this, the whole being covered with a cover glass and ringed round with vaseline. The specimen was kept for 20 hours at a constant temperature of about 25° C. and then examined to see if any microfilariae had entered the tubes. Unfortunately a certain amount of blood is drawn into the tubes under such conditions and this of course makes the correct reckoning difficult, but even allowing for this a much larger proportion of embryos was found in the tube containing Malpighian extract. This indicates, therefore, that the Malpighian tubes of the mosquito have some power, chemical or otherwise, of drawing the young filariae to them.

G. C. L.

FÜLLEBORN (F.). **Beiträge zur Biologie der Filarien.**—*Centralbl. f. Bakt.* 1. Abt. Orig. 1912. Sept. 19. Vol. 66. Nos. 2–4. pp. 255–267. With 1 plate and curve.

In this paper the author first refers to the transference of microfilariae from an infected to a healthy animal. He mentions GRUBY and DELAFOND's experiments in this connection (*v. supra*),

and describes one carried out by himself. He inoculated an uninfected puppy with embryos of *Dirofilaria repens* (Railliet) and at subsequent dates examined its peripheral blood. At first some of these forms were recovered, but later none could be found. Eventually, two and three quarter years after the inoculation, the dog was killed and microfilariae, much greater in size than those of the original dog, were easily demonstrated in its lungs. No adults or developing forms were found in its connective tissues or heart, this indicating that no natural reinfection with metamorphosed mosquito forms had taken place. The recovered embryos measured on an average 413·2μ in length, that is, about double the length of the ordinary embryonic forms of *Dirofilaria repens* and they were somewhat broader. No changes analogous to those occurring in embryos developing in the Malpighian tubes of mosquitoes were seen. A similar experiment with mice showed that the same dog microfilariae would remain alive in the lungs of these rodents for at least 67 days. Human microfilariae, however (*F. bancrofti, F. loa, F. perstans*), injected into mice and monkeys always gave negative results, as regards their recovery both in the peripheral and lung blood.

Experiments indicating the influence of drying, freezing, osmotic pressure, effects of light, X rays, and the electric current on the embryos are described and the periodicity of the embryonic form of *Filaria loa* (*Microfilaria diurna*) is discussed. Some results of attempts to infect insects (mosquitoes) with the embryos of *Filaria perstans, F. loa,* and some of the dog filariae are also given. Migration to the muscles was noted and a certain degree of development.

The second part of the paper deals with transplantation experiments with developing filariae from an infected to a second dog. Five developing *Dirofilaria repens* were implanted in a healthy dog and its blood was examined afterwards to determine if embryonic forms appeared in it. Positive results were obtained in two and a half months; after five months, however, embryos became very scarce and after nine months they had disappeared altogether. The dog died one year after the transplantation and neither embryos nor adults were then found, the infection having died out.

[The paper is a useful one as it brings together much of Fülleborn's work on filariasis. Many of the experiments have been published before. The attempts to infect mosquitoes with embryos of *F. perstans,* though interesting, are of course in no way conclusive.]

G. C. L.

Low (George C.). **A Note on the Pathology of Chyluria.**—*Jl. London School of Trop. Med.* 1912. July. Vol. 1. No. 3. pp. 243–250.

The author describes the examination of the urine of a patient believed to be suffering from chyluria. The examination, however, revealed the fact that there was an apparent absence of fat

in the specimen, an absence already noted by WISE in similar cases in British Guiana. Microscopically, small lymphocytes formed the chief cell constituent of the urine.

At a later date an opportunity occurred of working out the pathology of a similar case, an autopsy having been obtained on a patient who had died in the midst of an attack, of what to all intents and purposes was chyluria.

A careful dissection, however, revealed the fact that the thoracic duct was perfectly normal from its termination at the junction of the left subclavian and internal jugular veins right down through the thorax to the receptaculum chyli. The milky fluid passed during life was not, therefore, coming from there.

The left kidney was somewhat enlarged and on the organ being split through from the outer surface to the pelvis, much reddish-tinged milk-like fluid escaped from its substance, the pelvis also being full. Around and near the pelvis were gaping vessels, the orifices of dilated lymphatics. The right kidney was smaller than the left. On section the same kind of fluid as was found in the left escaped but in very much smaller quantities, the lymphatic leakage being much slighter. The left ureter was considerably dilated with a much thickened wall, this condition beginning at and involving the left pelvis and extending down to the bladder. The opening into the bladder was quite patent and no cause of obstruction, such as a calculus, could be found. The right ureter appeared normal and there was no dilatation of the pelvis. Both ureters were full of haemato-lymph. The bladder was distended and when it was opened blood and lymph similar to that passed during life and to that found in both kidneys poured out. After all the fluid had drained away many large gelatinous masses remained, these having been chiefly responsible for the dilatation of the viscus. The wall of the organ was much hypertrophied and the mucous membrane was injected. Near the fundus there was an area covered with blood and when this was washed away the mucosa was seen to be raised into a series of minute, almost villous-like, projections.

An examination of the fluid from the bladder, ureters and kidneys showed that this consisted of blood and lymph, practically no fat being present, so that the condition correctly designated was a haemato-lymphuria and not a chyluria.

An exhaustive search was made both for adult and embryonic filariae; the results showed that all active infection had died out, the pathological lesions produced by the filariae alone remaining. No living adult filariae were found, but that they had been abundantly present at one time was evidenced by their calcified remains, several being found in the wall of the hydrocele sac and five in the pelvis of the right kidney. It was almost certain that other similar remains were lying in other situations, but none were actually found. Further, no embryonic filariae were found anywhere, this again indicating that all the adult forms were dead. Blood from many different situations was carefully searched for these, as was also lymph from many glands, and the haemato-lymph from the kidneys, ureters and bladder.

The microscopical examination of the tissues bore out the macroscopical appearances, dilated lymphatics being easily seen in the sections of the kidneys, ureters and bladder.

From an anlysis of these different points the author concludes that it is altogether erroneous to call all cases of milky urine

chyluria. The two described were in reality cases of lymphuria, the second one in addition showing much blood, *i.e.*, a condition of haemato-lymphuria. He therefore believes that the term lymphuria will have to be used in the future for similar cases in contradistinction to chyluria, and that in all probability such cases will be found to be much more frequent than is generally supposed. The lymph may come from any part of the urinary tract, depending of course on where the blockage of the lymphatic trunks is situated. In the case under discussion this must have been extensive, as both sides were involved. Probably the main block was in the juxta-aortic glands adjacent to the kidneys or in the efferents from these on their way to the thoracic duct.

G. C. L.

WELLMAN (Creighton) and JOHNS (Foster Mathew). **The Artificial Culture of Filarial Embryos. A Preliminary Note.**—*Jl. Amer. Med. Assoc.* 1912. Oct. 26. Vol. 59. No. 17. pp. 1531–1532.

The authors state that they have attempted the nurture in artificial media of the embryos of *Filaria immitis* (Leidy). Embryos of this species were found to live for ten or twelve days in specimens of sterile defibrinated dog's blood at room temperature (28° C.) and considerable increase in size occurred, the parasites growing to one and two thirds their former dimensions. Other media were also employed, the best results being obtained with dextrose dog serum at low temperatures. With this medium life was prolonged from twelve days to two weeks and the parasites became from two to two and one third times as long as when planted.

The suggestion is put forward that by these methods the embryo filariae were nurtured to a point which corresponds with the limit of their development in the digestive tract of the mosquito and that ultimately they might be carried to sufficient maturity to infect animals.

[Against such a hypothesis is the fact that the embryo filariae do not increase in length in the stomach of the mosquito, but pass directly into the Malpighian tubes. Further, the first change in their metamorphosis is an increase of breadth, not of length.]

G. C. L.

FILARIASIS IN THE BRITISH WEST COAST COLONIES.

Northern Nigeria.—In the annual medical and sanitary report for the year ending 31st December, 1911, no case was returned as filariasis. Seven European cases were returned as lymphangitis; 186 native cases were returned under diseases of the lymphatic system; twenty European and 225 native cases were returned as pyrexia of uncertain origin; and two native cases were returned as suffering from a nematode infection. Having regard to the known prevalence of filariasis in the Protectorate Dr. BLAIR considers it is fair to suppose that many of the above mentioned cases were examples of it.

Southern Nigeria.—In the annual report on the Medical Department of Southern Nigeria for the year 1911 the statement is made that only 22 cases of filariasis came under observation in the whole Colony during the year. It is further stated that several Europeans in the Colony are known to harbour *Filaria loa* with apparently very little inconvenience to themselves.

[These figures are apt to be misleading. Infections with *F. bancrofti*, *F. loa* and *F. perstans* are very common in that part of West Africa and if properly looked for would easily be found. Symptoms of course are not always present even in *F. bancrofti* infections.]

Sierra Leone.—In the annual report on the Medical Department of Sierra Leone for the year ending 31st December, 1911, it is stated that Dr. McConaghy examined one hundred slides of night blood taken from school boys at a place called Bo. Embryonic forms of *Filaria bancrofti* were found in ten of these (ten per cent.), embryonic forms of *Filaria perstans* in one (one per cent.).

[If medical officers in the different districts of West Africa recorded similar observations, a general idea of the prevalence of filariasis could be obtained. The day blood should be taken as well as the night blood and as large a number of individuals as possible examined.]

G. C. L.

Elephantiasis.

Pelletier (J.). **Cas d'Eléphantiasis du Scrotum observés au Sénégal.**—*Bull. Soc. Path. Exot.* 1912. Oct. Vol. 5. No. 8. pp. 625–627.

Elephantiasis is relatively common amongst the black population of Senegal. The author has operated upon seven cases of elephantiasis of the scrotum, the weight of the tumours varying from 2 to 100 kilos. The enormous size which they may attain is well shown in a series of photographs of a native afflicted with this disease; when he was standing the mass rested on the ground. Another photograph shows the very satisfactory result of the operation for removal. For these large tumour masses Pelletier proposes to modify the operation usually in vogue. He gives a description of the different steps he proposes.

G. C. L.

Madden (Frank Cole), Ibrahim (Aly) and Ferguson (A. R.). **On the Treatment of Elephantiasis of the Legs by Lymphangioplasty.**—*Brit. Med. Jl.* 1912. Nov. 2. pp. 1212–1214.

Handley's operation of lymphangioplasty for the cure of elephantiasis was repeated under favourable circumstances in Cairo. Handley in a summary of his own work wrote: "To my mind lymphangioplasty has failed to establish its position in the treatment of elephantiasis." He believed that gravity nullified the results as much as anything else. The clinical results of the authors are in harmony with those of Handley, but they find in addition that the artificial lymph channels do not persist for any length of time and that there is finally an obstruction to lymph

return from the obliteration of lymphatics in the neighbourhood of the inserted threads. A record of eight cases is given, and an account of a series of experimental lymphangioplasties in healthy guinea pigs.

The writers' conclusions are as follows:—

"1. Clinically, it is abundantly evident that lymphangioplasty fails to effect anything but a very temporary improvement in elephantiasis of the legs. The swelling is very markedly reduced within 48 hours after the operation; but the improvement persists only so long as the recumbent position is maintained. Within at most 21 days after the operation, or as soon as the patient begins to walk, the swelling invariably returns and no permanent improvement results.

"2. The examination of the tissues surrounding threads introduced during the operation of lymphangioplasty in cases of elephantiasis, and also around threads introduced into healthy tissues of man and of guinea-pigs, supplies very adequate reasons for the failure of the operation.

"Important as the action of gravity may be in contributing to the failure to maintain a new artificial lymphatic circulation, it appears that this want of success is due in far greater degree to definite reactive changes in the tissues immediately around the thread, which soon isolate the new lymph tube from the surrounding lymphatic areas and eventually completely obliterate it.

"Briefly the series of changes in the tissues around buried longitudinal threads in the subcutaneous tissues are as follows:—

"1. For a short time the threads, by virtue of their capillary action, drain the surrounding tissues of the lymph contained in them.

"2. The threads in the tissues soon excite a definite cellular reaction, which leads comparatively soon—from 14 to 21 days—to the formation of a dense and progressively contracting fibrous tissue. This walls off the thread and crushes the adjacent lymphatics out of existence, and thus effectually prevents any absorption of fluid into the space immediately around the thread itself. These fibrous changes, occurring around the ends of the thread, as well as along its whole length, eventually completely isolate it, and it may then perhaps be compared to a long worm lying within an impermeable sheath.

"3. The thread is later penetrated by rows of cells, running in along its fibrils, which must eventually lead to its complete disintegration; and the formation of a solid column of dense fibrous tissue along which no absorption of fluid of any kind can possibly occur."

G. C. L.

KONDOLEON (Emm.). **Die operative Behandlung der elephantiastischen Ödeme.** [Operative Treatment of Elephantiasis].—*Zentralblatt f. Chirurgie.* 1912. July 27. Vol. 39. No. 30. pp. 1022–1025.

The author describes the operations of MIKULICZ, LANZ, and HANDLEY for this condition and gives the details of one devised by himself. His studies on the pathology of the disease have led him to the conclusion that the lymph stasis chiefly occurs in the fascia and therefore that this is the tissue that should be removed, so as to make a broad communication between the subcutaneous tissues and the muscles. It is of course impossible to remove the whole of the thickened fascia in a case of elephantiasis of the leg, but long strips on the outer and inner sides may be suitably excised. He describes the details of the operation and states that the results (six cases) were satisfactory. The cases, all non-tropical, were seen in Athens. Their etiology differed considerably. Two followed a purulent inflammation of the feet, one erysipelas of the

leg, one healed tubercle of the knee joint, one a total extirpation of the inguinal glands, while in the last no cause was determined.

[The etiology of these non-tropical cases of elephantiasis is interesting. Surgeons have conducted very similar operations to those described by the author on filarial cases in the tropics, but the results cannot be said to have been generally satisfactory. No mention of these is made in the paper.]

G. C. L.

HUNTER (Walter K.). **Note on a Case of Elephantiasis occurring in this Country.**—*Glasgow Med. Jl.* 1912. Sept. Vol. 78. No. 3. pp. 166–169. With 1 plate.

A case of elephantiasis occurring in a woman who had never been out of Britain is here described. The patient, aged 61, had suffered for about thirty years, the condition having first appeared after repeated attacks of erysipelas. Syphilis also was probable. Both legs were very greatly increased in size and swollen in such a way as to alter their general contour considerably. The subcutaneous tissue was dense and firm, and did not pit on pressure. Ascites was also present, necessitating paracentesis. This had to be repeated and ultimately the patient died, about one month and a half after her admission to hospital.

The autopsy showed that the aortic and mitral cusps were thickened and atheromatous; early atheromatous changes were present also in the coronary arteries, and the lungs were congested and emphysematous. The abdominal cavity contained a thin purulent fluid; the liver was slightly enlarged with a roughened surface; the spleen was greatly enlarged and its capsule was much thickened; dense firm adhesions existed round both organs. The retro-peritoneal glands were enlarged. Sections of the skin from the lower limbs showed a hyperplasia of the subcutaneous tissue; there was no thickening of the epidermis, and the *cutis vera* was not unduly fibrous; here and there small collections of mononuclear cells could be seen.

[Non-filarial elephantiasis cases, such as the above, are met with from time to time in England and in other non-tropical countries. Erysipelas, especially if recurring, is one of the chief causes, but in some cases the origin cannot be detected during life.]

G. C. L.

FILARIASIS IN ANIMALS.

PLIMMER (H. G.). **On the Blood Parasites found in Animals in the Zoological Gardens during the Four Years 1908–11.**—*Proc. Zool. Soc. Lond.* 1912. June. Part 2. pp. 406–419. With 7 plates.

The earlier part of the author's paper deals with the parasitic worms (microfilariae) found in the blood of the different animals examined by him. These were found in fifteen mammals of thirteen different species, in 101 birds of 74 different species, and in thirteen reptiles of five different species. Filariae, he states, have not been found before in 88 out of these 92 species of animals, and are new, at any rate as regards hosts. The animals

came from all parts of the world, the largest number from the Americas, but other parts of the world also were well represented.

[These statistics show that infections with different species of filariae are very common in the lower animals.]

G. C. L.

RAILLIET (A.), HENRY (A.) and LANGERON (M.). **Le Genre *Acanthocheilonema* Cobbold, et les Filaires péritonéales des Carnivores.**—*Bull. Soc. Path. Exot.* 1912. June. Vol. 5. No. 6. pp. 392–395.

The authors, writing on the Nematode genus *Acanthocheilonema*, proposed by COBBOLD in 1870 for a filaria-like worm living in the peritoneal cavity of the aard wolf (*Proteles cristatus*), incorporate in this group the *Filaria perstans* (Manson) of man and the *Filaria recondita* (Grassi) of the dog. They note also that COBBOLD appears to have confused the anterior end of the body with the posterior, the characteristic hook-like lips which he regarded as distinctive for the genus being actually the cuticular expansions at the posterior extremity, which are familiarly known in medical literature as the Bishop's mitre. This inversion accounts for his failure to detect a vagina and for his erroneous conclusion that the genus *Acanthocheilonema* is a close ally of *Dracunculus*. From a note published two years ago in the *Proceedings of the Zoological Society*, London, it would appear that these data had already been established by LEIPER from an examination of COBBOLD's original material preserved in the Hunterian Museum, and the present paper therefore, re-affirms the view there expressed that the *Filaria perstans* of man must now be placed in a separate genus, *Acanthocheilonema*.

G. C. L.

FÜLLEBORN (F.). **Zur Morphologie der *Dirofilaria immitis* Leydi [Leidy] 1856.**—*Centralbl. f. Bakt.* 1. Abt. Orig. 1912. July 17. Vol. 65. Nos. 4–5. pp. 341–349.

The author discusses the morphology of the common dog filaria, *Filaria immitis*, now classified in a new genus as *Dirofilaria immitis* by RAILLIET and HENRY. He describes material obtained from Texas and from Shanghai and finally comes to the conclusion that the parasites from these areas are of the same species and are identical with *Dirofilaria immitis*. Many careful measurements show this. The author touches on the difficulty of distinguishing *immitis* embryos from those of *F. repens* (*Dirofilaria repens* in the new terminology of Railliet and Henry) and states that this is practically impossible.

G. C. L.

BAUCHE (J.) et BERNARD (P. Noel). **Note sur Quelques Filarioses Animales de l'Annam Central.**—*Bull. Soc. Path. Exot.* 1912. Oct. Vol. 5. No. 8. pp. 622–624.

In a previous note the authors described a series of filariae from animals in Annam. These were determined by RAILLIET

and HENRY as follows:—*Dirofilaria repens* (subcutaneous filaria of the dog), *Setaria bernardi* (peritoneal filaria of the pig), *Eloeophora poeli* (B. Vryburg, 1887) and *Onchocerca armillata* (intravascular filariae of cattle), and *Filaria bauchei* (lung filaria of pig).

They now add some notes on filariasis in the same region. Besides the parasites mentioned above they have met with a microfilaria in the blood of a young pig, with the *Setaria labiato-papillosa* (Alessandrini, 1838) a filaria of the peritoneal cavity of cattle and buffaloes, with the *Setaria equina* (Abildg. 1789) a filaria of the peritoneal cavity of the horse, and with a filaria of the eye of fowls, *Oxyspirura mansoni.*

Human filariasis would seem to be rare, examinations of prisoners, patients in hospital and others having given negative results. Three cases of elephantiasis, however, were seen, a fact which indicates that *Filaria bancrofti* does exist in Annam.

G. C. L.

DRACONTIASIS.

CHITALE (P. K.). **Observations on 300 Cases of Guinea Worm.**—*Indian Med. Gaz.* 1912. Aug. Vol. 47. No. 8. pp. 318–320.

The guinea worm is regarded by Major Chitale as fairly common in the town of Damoh in the Central Provinces, India, and in the villages around within a radius of five miles. The specimens found range in length from thirteen to thirty-eight inches and vary from one-twelfth to one-tenth of an inch in thickness. The mouth has a triangular orifice, close to which on the dorsal and ventral surfaces are two raised papillae surrounded by smaller raised dots, about four to five in number. Infection is traced to the water of certain wells and tanks in which persons suffering from guinea worm wash their ulcers. The complications noted in neglected cases are (1) extensive abscesses, (2) fistulae and sloughing, (3) stiffening and ankylosis of joints. A fatal termination is rarely met with. The author finds that the application of poultices of young sprouts of the Baman tree mixed with gur and linseed meal night and day, as recommended in old Sanskrit medical works, certainly softens the tissues and greatly facilitates the removal of the worm. The wells are treated with permanganate and sulphate of copper, 1 : 100,000. A daily use of minute doses of Liq. arsenicalis or of asafoetida is said to act as a preventive.

R. T. Leiper.

GRAHAM (W. M.). **A Report upon Experiments made at Lagos to Ascertain the Possibility of Killing Cyclops in the Public Wells by Heating the Well Water with Steam from a Portable Steam Boiler.**—Report to the Secretary of State for the Colonies.

A practical test of the method suggested by LEIPER,* of dealing with guinea-worm infected town-wells by means of steam, has

* *Jl. London School of Trop. Med.* 1912. Vol. 1. Pt. 1. pp. 28–30.

been made in Lagos. The public wells in the Lagos township are all fed by sub-soil water and vary greatly in the amount of water they contain at different seasons. The water is brackish save at Ebuta Metta. For the purposes of the experiment it was necessary to find a well in which cyclops existed in sufficient numbers to permit of a rapid determination of their presence. One of the wells at Ebuta Metta was selected as fulfilling the requirements. The well was 24 feet deep and had a depth of water of four feet one inch. The temperature at the commencement of the experiment was 28° C. Steam was passed into the water through an iron pipe one and a quarter inches in diameter, under a pressure of about forty pounds to the square inch. At the end of one hour the temperature of the well water had reached 63° C. and living cyclops had disappeared. Laboratory experiments, made previously, had demonstrated that the various species of cyclops met with in Lagos water were killed in water raised to a temperature of 42·5° C. to 43° C. The Director of the Medical Research Institute reports that the method proved an easy and fairly rapid way of dealing with infected well water at the end of the dry season, when the water in the well was almost at the lowest level, and that it is evidently a practicable method of killing organisms such as cyclops in wells without rendering the water useless. A series of experiments was also undertaken to ascertain if the cyclops are capable of surviving in the mud during the dry season and restocking the wells temporarily sterilised by this method. The results so far have been negative for cyclops, but the closely allied Daphniae showed a capacity for revival from sun-baked mud. Dr. Graham concludes that further investigations may show that cyclops can likewise produce resting forms.

[It remains to be shown that, even if such resting stages occur in mud at the bottom of wells which contain water, they are capable of surviving a temperature fatal to free swimming stages.]

R. T. L.

LANE (Clayton). **The Prevention of Guinea-Worm Disease.** [Correspondence.]—*Indian Med. Gaz.* 1912. July. Vol. 47. No. 7. p. 294.

Major Clayton Lane writes to the editor of the *Indian Medical Gazette* in the interests of Indian hygiene regarding the criticisms made in a recent issue of the *Gazette* upon the suggestion of LEIPER (*v. supra*) for the eradication of guinea-worm from infected town wells. It will probably be generally admitted, he suggests, that it is at least premature to condemn the proposal as impracticable, and as the method has every appearance of proving cheap and feasible he hopes that its efficacy may be given a practical test under the conditions proposed.

R. T. L

ALCOCK (A.). **Miscellaneous Notes from the Entomological Department. 3. A Suggestion for Destroying Cyclops in Small Collections of Water.**—*Jl. London School of Trop. Med.* 1912. July. Vol. 1. Pt. 3. p. 206.

Cyclops have been found to be very sensitive to caustic potash: a solution of 0·15 per cent. kills them instantaneously, while 0·07 per cent. is fatal in two to ten minutes. In the weaker solution an occasional female may still show signs of life after ten minutes. The weaker solution works out at one pound of KOH to about 180 gallons of water. The author regards the method as cheap, efficient, and probably harmless, and thinks it applicable in villages where guinea-worm exists and the wells are known to be infected with cyclops.

R. T. L.

HELMINTHIASIS.

Ankylostomiasis.

Bozzolo (Camillo). **Notes on the Treatment of Ankylostoma Anaemia (Uncinariasis, Hookworm disease) with Thymol.** *Jl. Amer. Med. Assoc.* 1912. June 8. Vol. 58. No. 23. pp. 1744–1746.

Bozzolo, the originator in 1879 of the thymol treatment of ankylostomiasis anaemia, as a result of his accumulated experience regards as exaggerated the fears of those who consider the after effects of the drug as likely to be poisonous, and see a danger in the giving of large doses or the contemporaneous administration of alcohol. In some cases he has administered in capsules no less than 12-15 gms. in twelve hours with no observable ill effects. Only one case has ever proved fatal in his hands: that of a woman with marked enteritis. Before applying the drug to the treatment of ankylostomiasis anaemia Bozzolo had used it with success in glycosuria with no serious after effects. An explanation of the apparent contradiction between the small number of worms recovered from the faeces and the improvement of the patient under treatment is most probably to be found in the gradual poisoning of the parasites and their digestion during the slow passage through the bowel, which gives ground for administering smaller doses in weak persons and where proper supervision cannot be maintained. In cases of persistent enteric catarrh it is also advisable to precede the anthelmintic treatment by a dry diet and administration of preparations of tannin. With regard to the solvent action of alcohol on thymol and the possibility of severe poisoning it is of interest to note that Bozzolo used to give 12 gms. in capsules of 6 gms. each at two hours' interval, and that a small glassful of strong wine or some alcoholic mixture was administered after each dose to facilitate the solution of part of the drug. In these cases no other phenomena than giddiness, tipsiness, and sleepiness were observed although the urine was dark in colour and gave a phenol reaction with ferric chloride.

R. T. Leiper.

Cockin (R. P.). **A Further Report on Work done in connection with Ankylostomiasis at the Colony Hospital, St. George's, Grenada [Windward Islands].**—Report to the Secretary of State for the Colonies, July, 1912.

In continuation of a previous report on the extreme prevalence of ankylostomiasis in the Colony of Grenada, R. P. Cockin gives the results of an examination of a further series of over a thousand cases and again urges the necessity for a vigorous campaign. During the investigation the following helminths were determined: *Ancylostoma duodenale, Ascaris lumbricoides, Oxyuris vermicularis, Trichocephalus trichiura, Strongyloides stercoralis, Taenia solium,* and doubtfully *Taenia confusa.* Of one thousand consecutive cases microscopically examined 64·2 per cent. showed eggs of *A. duodenale,* 70·5 cent. those of *A. lumbricoides,* and 73·8 per cent. of *T. trichiura.* The *Oxyuris vermicularis* was determined in 9·5 per cent. and *S. stercoralis* in 12·1 per

cent. The author gives striking testimony to the close association existing between ankylostoma infection and disease of the heart and kidney. Whereas in 159 cases cardiac and renal disease occurred in conjunction with ankylostomasis, in only 13 cases in the series was the parasite absent. That is, the association occurred in 92·5 per cent.—a percentage out of all proportion to the degree of infection amongst the sick population generally. The chief form of cardiac affection in these cases was dilatation, following upon degenerative changes in the heart muscle. For a period of six months three distinct methods of treatment were practised at the Colony Hospital: thymol, eucalyptus and chloroform, and beta-naphthol. Dr. Cockin's experience points to the undoubted superiority of beta-naphthol, not only on account of its rapid and complete expulsion of the parasites, but also because of its cheapness and the freedom from danger in its administration. The only complication noted in its use was haemoglobinuria, which occurred in five of the cases.

R. T. L.

NICHOLLS (Lucius). **Windward Islands (St. Lucia) Laboratory Report for the Six Months ended March 31st, 1912: (3) Ankylostomiasis in Domesticated Animals.**—Report to the Secretary of State for the Colonies.

Dr. Nicholls regards ankylostomiasis as undoubtedly the most important disease of domesticated animals in the island of St. Lucia and as the cause of death of a large number of sheep, a poor and emaciated condition in numerous horses, and the loss of many dogs. The diagnosis was easily effected by microscopical examination of the faeces and treatment consisted in administering large doses of β naphthol or thymol followed by Epsom salts. The dosage recommended is: three doses of one and a half drachms each for ponies, three doses of one drachm for sheep and three doses of twelve grains each for dogs, to be given at intervals of an hour in the morning after fasting.

[These observations are of special interest in view of the widespread occurrence of ankylostomiasis amongst the inhabitants of the Windward Islands, but it should be noted that most probably the term ankylostomiasis is here used in a wide sense, to include all the parasitic nematodes in which the ova resemble those of the ankylostomes of man. There is no reason to suppose that the gross infection of these domesticated animals would be a source of danger to man although it undoubtedly, as Dr. Nicholls points out, is a source of much loss to breeders.]

R. T. L.

GLOVER (M. W.). **Hookworm among Oriental Immigrants.**—*Jl. Amer. Med. Assoc.* 1912. June 15. Vol. 58. No. 24. pp. 1837–1840.

Advantage has recently been taken of the provisions of the Immigration Act, regulating the admission of aliens into the United States, to make a routine examination of the stools of a considerable numbers of the aliens passing through the immigration station on Angel Island, California. Of 2,255 persons no

less than 1,077 were found to harbour either the *Ancylostoma duodenale* or the *Necator americanus*. 63 per cent. of the Hindus examined were found to be infected, and their rejection led to an effectual check upon this class which was beginning to assume embarrassing proportions. It was remarked, however, that in marked contrast to the Chinese and Japanese, these Hindus, chiefly from the Punjab, were strikingly free from the other common intestinal parasites. A large number of statistics is given to show the age incidence of infection amongst males and females of Chinese, of Japanese, and of Hindu aliens, but great care must be made in drawing any deductions of a sweeping character therefrom, as it is apparent that the social antecedents of the various groups are recognised to be widely different. The author regards the possibility of the infection of the Pacific coast and South-Western states as a very grave one. This sparsely inhabited region is now rapidly becoming settled by orientals, who retain their careless personal habits and conservative adhesion to patriarchal modes of fertilisation of the soil with human excrement. Unless some definite attempt at communal action is made very soon, there seems little doubt that, in a short time, the problem now being faced in the south-east by the Rockefeller Commission will present itself in an aggravated form in these regions also.

R. T. L.

L'Anchilostomiasi tra gli Operai delle Solfare in Sicilia. [Ankylostomiasis amongst the Sulphur Miners in Sicily.]—*Policlinico.* Sez. pratica. 1912. June 9. Vol. 19. No. 24. pp. 876–881.

In 1898 a Government Commission had ascertained that the workers in the sulphur mines in Sicily were infected with ankylostomes to the extent of fifty per cent. More recently the percentage has been estimated at about seventy per cent. *Il Policlinico* devotes an editorial article to the discussion of the best organisation by which the various measures of prophylaxis can best be adapted to the peculiar conditions of the work and the character of the employees.

R. T. L.

Dorsett (Thomas W.). **Syphilis complicated with Uncinariasis.**—*Jl. Amer. Med. Assoc.* 1912. Aug. 10. Vol. 59. No. 6. pp. 445–446.

The effects of salvarsan appear to Dorsett to have been retarded or counteracted in a case of syphilis, exhibiting a very large chancre, which recently came under his notice. 0·6 gm. of salvarsan was injected intravenously with very little reaction. The symptoms, instead of improving, gradually became worse and the chancre grew larger and very foul. After ten days the patient was treated for ankylostomes and a large number of worms were removed. Thereupon the chancre and other symptoms rapidly disappeared and in another ten days recovery was complete.

R. T. L.

SCHÜFFNER (W.). **Der Wert einiger Vermifuga gegenüber dem Ankylostomum, mit Bemerkungen über die Wurmkrankheit in Niederländisch-Indien.** [The Comparative Value of Vermifuges in Ankylostome Infection.]—*Arch. f. Schiffs. u. Trop. Hyg.* 1912. Sept. Vol. 16. No. 17. pp. 569–588.

This paper embodies a valuable series of comparisons between the action of the various anthelmintics used in the treatment of ankylostomiasis.

From 21 cases treated with Extractum filicis maris (10-12 gram dose) seven ankylostomes and no *Ascaris lumbricoides* were obtained. Some days later a course of thymol produced no less than 1,253 ankylostomes and four ascaris.

Freshly prepared Areca catechu (30-40 grams dose) given to twenty cases resulted in the passage of six ankylostomes and seven *Ascaris lumbricoides.* The same cases under thymol gave a few days later 745 ankylostomes and 65 ascaris.

In 96 cases thymotal (thymol carbonate), in doses of 5 to 25 grams, was administered, producing 115 ankylostomes and three *Ascaris lumbricoides.* The same cases a few days afterwards were treated with thymol and provided 4,709 ankylostomes and 203 ascaris.

One hundred cases treated with eucalyptus-chloroform-castor oil mixture passed 1,219 ankylostomes and eleven *Ascaris lumbricoides* and afterwards as a result of thymol administration a further 2,010 ankylostomes and 91 ascaris.

One hundred cases treated first with thymol passed 2,975 ankylostomes and 116 *Ascaris lumbricoides,* and upon additional treatment with eucalyptus mixture, got rid of 469 ankylostomes and five ascaris. When thymol was used in the first instance it accounted for 86 per cent. of the total number of worms removed, whilst eucalyptus under similar circumstances only accounted for 38 per cent.

In 100 cases submitted to two separate treatments with thymol the worms removed were (a) 2,423 ankylostomes and 283 ascaris and (b) 500 ankylostomes and 83 ascaris, *i.e.*, a total of 2,923 ankylostomes and 367 ascaris. Those accounted for by the first course of treatment being 83 per cent., those by the second 17 per cent. of the total.

One hundred cases (averaging from 160 cases actually treated) treated first with thymol gave 1,601 ankylostomes and 271 *Ascaris lumbricoides,* and later with β naphthol a further lot of 270 ankylostomes and nine ascaris: *i.e.*, the thymol accounted for 86 per cent. and the naphthol for 14 per cent. of the total.

One hundred cases (averaging from results of 122 actually treated) treated firstly with β naphthol gave 1,928 ankylostomes and forty ascaris, and later to thymol yielded an additional lot of 1,059 ankylostomes and 137 ascaris, *i.e.*, the β naphthol removed 64 per cent. and the thymol 36 per cent. of the total.

Thus on the basis of single treatment with the anthelmintic thymol dislodged 83 per cent., β naphthol 64 per cent. and eucalyptus 38 per cent. of the ankylostomes. Schüffner states that thymol proved highly efficacious also in its action against

oxyuris, trichocephalus, and all forms of taenia. In cases with acute and subacute dysentery the exhibition of thymol is strongly contra-indicated.

R. T. L.

SCHISTOSOMIASIS.

CONOR (A.) et BENAZET (L.). **Formule Leucocytaire et "Image d'Arneth" dans la Bilharziose.**—*Bull. Soc. Path. Exot.* 1912. June. Vol. 5. No. 6. pp. 396–400.

An examination of the blood in fifty cases of urinary bilharziasis in South Tunis shows a diminution in the neutrophile polymorphonuclear leucocytes, a well marked increase in the number of the eosinophiles, the occurrence of myelocytes with acidophile granules, and a lowering of the neutro-leucocytic quotient (*i.e.*, percentage of neutrophile polymorphonuclears divided by the total of the percentages of the other leucocytes). Lymphocytosis is absent. The eosinophiles range from four per cent. to 48 per cent. In thirteen cases the percentage was under ten: in twenty-five cases it lay between eleven to twenty per cent., whilst in ten cases it reached 21 to 30 per cent. These cells appear to increase but little in the early stages of infection, attaining a maximum at about the second year of the malady and decreasing thereafter.

The "image d'Arneth" is a formula in which the neutrophile polymorphonuclear leucocytes are grouped into five sets according to the number of fragments into which the nuclear mass is subdivided. According to ARNETH the leucocytes are broken up under the influence of an infection and set free their antibodies. If the polynuclear leucocytes are derived from myelocytes by segmentation of the nucleus, the forms first to be disintegrated are those presenting a large number of nuclei so that the multinuclear leucocytes are in smaller proportion than those with only one or two nuclei. The formula is said in this circumstance to deviate to the left.

In the nineteen cases of bilharziasis investigated for this phenomenon there was a distinct deviation *to the right*, there being a large increase in the number of forms with multiple nuclei. Eosinophile leucocytes with three and four nuclei occurred more frequently than in normal human blood.

R. T. L.

COURTOIS-SUFFIT, JACQUET (P.) et GÉRY (L.). **Un Cas de Bilharziose Intestinale contractée à la Guadeloupe.**—*Gazette d. hôpit.* 1912. May 14. Vol. 85. No. 56. pp. 833–837.

Since MANSON described a case of bilharziasis from Antigua in 1903 other observers have revealed the existence of this disease, especially in its intestinal manifestations, in other islands of the Antilles. Guadeloupe is now added to the list of endemic centres in the West Indies. A typical example of intestinal bilharziasis has recently come under the notice of the authors, who give a full account of the post-mortem lesions found in the various

organs—the liver, spleen and lungs showing marked fibrosis. The disease progressed very rapidly and proved fatal within a year. Of especial note were the intensity of the cirrhotic phenomena and the associated ascites and splenomegaly. The manifestations of the disease in this case are regarded as being "septicaemic" in type. The convulsions which marked the termination of the malady are held to be a direct outcome of the infection.

R. T. L.

MILTON (Frank). **Speculations on the Life-History of *Schistosomum haematobium*.**—*Jl. Trop. Med. & Hyg.* 1912. Aug. 1. Vol. 15. No. 15. pp. 225–227.

From his experience of the effects of the *S. haematobium* on man and for other reasons Milton is led to believe in the possibility of auto-reinfection in certain cases, and that, as a consequence, practically the whole life cycle may, in some instances, be completed in man without the intervention of an intermediate host. He further states that the idea has long been fixed in his mind that infection takes place through the skin in all cases where infection is from without. He regards the lack of success of the attempts made by LOOSS, LORTET, and others to induce direct infection by the miracidium to be due possibly to the unsuitability of the material with which the investigations were made, and considers not liver, but spleen or lymphatic gland to be the most likely nidus for the developing cercaria.

R. T. L.

MURSELL (H. Temple). **Perforating Appendicitis of Bilharzial Origin.**—*Lancet.* 1912. Sept. 21. p. 818.

Bilharzial infiltration of the appendix is not uncommon in African natives who collect in Johannesburg for work in the mines, but it would appear that no case has hitherto been recorded in which appendicitis of bilharzial origin has resulted in perforation and been operated upon. In the case here recorded there was an indefinite history of recurrent abdominal pain extending over a considerable period. When the patient was admitted to the Johannesburg Hospital the condition was diagnosed as an acute perforating appendicitis with widespread peritonitis and pus. The abdomen was opened over the region of the appendix. The pelvic cavity appeared to be full of pus, of which a large quantity was evacuated. A large moveable lump was found attached to the caecum by a short stalk of fairly healthy tissue. This proved to be the appendix. The proximal end merely showed catarrh, but on passing down towards the lump the muscular coats became enormously thickened and fibrotic with numerous bilharzia eggs. A large stercolith occupied the lumen and there was also a perforation into the general cavity of the peritoneum. The specimen is now in the Hunterian Museum in London.

R. T. L.

JOYEUX (Ch.). **Note sur quelques Cas de Bilharziose observés à Kouroussa (Guinée française).**—*Bull. Soc. Path. Exot.* 1912. July. Vol. 5. No. 7. pp. 504–505.

A number of recent communications tend to show that bilharzial infections occur more or less sporadically throughout the French possessions in West Africa. In Upper French Guinea cases have occurred at Timbuctoo, Bamako, Bakel, Ouahigouya, and Dakar. Five have now been seen by Joyeux at Kouroussa. The former records showed that the predominant clinical type was vesical infection, complicated in two instances by intestinal lesions. In Joyeux's cases attention was drawn to the malady by the nature of the stools. Out of a hundred patients suffering from dysenteric symptoms four presented the ova of *Bilharzia haematobia* in the faeces. The fifth case was of vesical origin uncomplicated by intestinal infection. In three cases the eggs showed terminal spines; in two, lateral spines. In one patient, according to the author, the discharges from the bladder and intestine alike contained lateral-spined eggs only. Unsuccessful attempts were made to establish the mode of infection by bathing a *Cercopithecus ruber* in urine containing miracidia.

R. T. L.

LOGAN (O. T.). **Schistomiasis (Japonicum) and "Urticarial Fever." A Disclaimer of the Priority of Suggesting that these Diseases were Identical.**—*China Med Jl.* 1912. July. Vol. 26. No. 4. pp. 240–241.

Dr. Logan writes to the editor of the *China Medical Journal* to emphasise the fact that the credit of first associating urticarial fever with infection by the Asiatic bilharzia worm belongs to Dr. HOUGHTON, who had been called in consultation to see a case of schistosomiasis under Dr. Logan's charge.

R. T. L.

CONOR (A.) et BENAZET (L.). **Enquête sur la Bilharziose en Tunisie. ii. Le Foyer du Nefzaoua.**—*Arch. Inst. Pasteur Tunis.* 1912. No. 3. pp. 118–130.

During the year ending June 1912 Conor and Benazet have determined the presence of bilharziasis in no less than 22 of the villages and oases of Nefzaoua, a region of Tunis situated on the eastern border of the Chott-el-Djerid. The total number of cases met with is 61, of which fifteen occurred in the village Glia; but as the main purpose of the enquiry was to localise endemic centres it seems fairly certain that the intensity of the infection will prove on more detailed investigation to be much greater. Of the cases observed 72·13 per cent. were between eleven and 25 years of age; in 72·5 per cent. the first symptoms manifested themselves between the ages of six and 25 years. The urine was coloured with blood in eighteen cases of under one year's duration, in eight cases of less than two years. The eosinophiles were uniformly increased and on an average formed 18·26 per cent. of the white cells. In thirteen out of the 61 cases

the presence of eosinophile myelocytes, in from one per cent. to four per cent., was noticed. The *image d'Arneth*, in these Nefzaoua patients, was deviated to the right. Using an analogous formula for the eosinophiles it appears that the binuclear forms make 83·47 per cent., those with three nuclei 14·79 per cent., and those with four nuclei 1·74 per cent. of the total eosinophile count.

R. T. L.

LANGERON (Maurice). **Mission Parasitologique en Tunisie (Septembre-Octobre 1911).**—*Arch. de Parasit.* 1912. Aug. 20. Vol. 15. No. 3. pp. 442–473.

In an account of a visit to Tunis for the purpose of enlarging the teaching collections of the Institute of Colonial Medicine in Paris, M. Langeron refers to the occurrence of bilharziasis in the oasis of Gafsa. During his brief stay there he succeeded in adding six cases of urinary infection to those already described by NICOLLE in 1908 and CONOR in 1910. Reference is also made to the intense infection of the oasis of Tozeur with ankylostomiasis, but time did not admit of new investigations on the subject.

R. T. L.

NEVEU-LEMAIRE (M.) et ROTON (A.). **Trois Cas de Bilharziose Vésicale observés à Dakar.**—*Arch. de Parasit.* 1912. Aug. 20. Vol. 15. No. 3. pp. 474–477.

As vesical bilharziasis had not been recorded hitherto from Senegal, the authors publish a description of three cases seen in the hospital at Dakar. The geographical distribution of the disease in Africa is summarised. It is endemic in Egypt and the Nile Valley. It extends almost without a break along the whole of the East Coast of Africa, Red Sea, Zanzibar, Portuguese East Africa, Zambesi, Delagoa Bay, Natal, St. Lucia Bay, Port Natal, and as far as Port Elizabeth in Cape Colony. It also extends inland, being found in Cape Colony, the Orange River Colony, Zululand and the Transvaal, Nyasaland, the valley of the Zambesi, in Uganda, the Sudan, and Kordofan, near Lake Chad, along the upper reaches of the Niger, and at Timbuctoo. On the West Coast isolated cases have been noted at Angola, Mossamedes and Cabinda, in the Cameroons, and on the Gold Coast. Further north it occurs at Casamance and lastly, as now noted, in Senegal. Along the northern shore bilharziasis is not infrequent in Tripoli, Tunis, and Algeria. In Europe the disease is rare and appears to be confined to Cyprus and Greece. In Asia it has been noted in Arabia at Mecca.

R. T. L.

TAPEWORM.

LUNN (W. E. C.). **Case of Tapeworm.**—*Jl. R. Army Med. Corps.* 1912. July. Vol. 19. No. 1. p. 99.

This case of tapeworm in a healthy woman of excellent physique is recorded on account of the apparently enormous

length and size to which the parasite seems to have developed. After a dose of extract of male fern, preceded and followed by castor oil, four portions of worm were passed and collected into a bucket of water. When laid out and measured the total length attained 79 feet four inches, whilst in places the segments had a breadth of one inch. No heads were recovered and, so far as the author could ascertain, all the portions belonged to the same strobila. A year previously a single portion twenty feet in length had been passed after treatment. The species was apparently not identified.

R. T. L.

ALLAN (W.). **Thymol for *Taenia saginata*.**—*Jl. Amer. Med. Assoc.* 1912. July 20. Vol. 59. No. 3. p. 197.

Thymol, given in the usual manner either with or without a preliminary course of saline purging, has proved very effectual in the author's experience during the past year. In three cases treated without previous starvation or purgation the tapeworms were evacuated and no recrudescence is manifest, although ample time has since elapsed to permit of the complete regeneration of the strobila had the treatment failed to remove the heads.

R. T. L.

GRONBERG (J.). **Der breite Bandwurm und die Magensaftsekretion.** [The Broad Tapeworm and the Secretion of Gastric Juice.]—*St. Petersburger Med. Zeitschrift.* 1912. June 28. Vol. 37. No. 12. pp. 184–186.

From a statistical study of a series of patients in Finland, where infection with the broad tapeworm, *Dibothriocephalus latus*, is exceedingly common, Gronberg concludes that this tapeworm has no special influence on the gastric juice secretion. A comparison of a parallel series of patients with and without the parasite shows a close correspondence in the percentage of cases with (*a*) lack of acidity, (*b*) hyperacidity, as well as in the degree of (*c*) free acid and (*d*) of total acidity. Moreover the amount of free hydrochloric acid and the total acidity remained practically unchanged in patients who had submitted to a 'cure' for tapeworm in the course of the investigation.

R. T. L.

HELMINTHIASIS AND EOSINOPHILIA.

COPPEDGE (L. J.). **A Severe Case of Hookworm Infection showing an Entire Absence of Eosinophilia.**—*Jl. Trop. Med. & Hyg.* 1912. June 1. Vol. 15. No. 11. pp. 166–168.

Details are given of a case in many respects typical of ankylostoma infection, especially as to history, personal habits, and lack of sanitary conveniences. An examination of the faeces revealed large numbers of eggs of *Necator americanus*. When careful differential counts were made an entire absence of eosinophiles was noted. ASHFORD and GUITERREZ state that in

one hundred severe infections a high degree of eosinophilia was almost constant, and the prognosis is grave when there was a paucity of eosinophiles as all these cases ended fatally. After 200 parasites had been expelled by thymol and purgatives, an examination of the blood gave one eosinophile in several slides. The patient made a good recovery. The differential count before treatment was as follows:—

	Per cent.
Small mononuclears	11
Large mononuclears	1
Neutrophiles (Polymorphonuclears) ...	70
Eosinophiles	absent.
Transitionals	14
Neutrophilic myelocytes	3
Basophiles	1
Normoblasts (two observed)	—

R. T. L.

Low (George C.). **The Absence of Eosinophilia in Chronic Cases of Helminthiasis.**—*Jl. of State Med.* 1912. July. Vol. 20. No. 7. pp. 413–417.

From his notes of blood examinations of a large number of natives, made in Uganda in 1902, Low contributes an instructive series of differential counts bearing upon the significance of eosinophilia in helminthiasis. Children and young adults when infected with helminths showed a well-marked eosinophilia, whilst none was observable in adults even when heavily infected with a variety of species. He suggests the hypothesis that the eosinophiles, which are tissue cells, at first come into the blood in response to some stimulus set up by the infection, but gradually disappear as this stimulus weakens with the prolongation of the infection. The development of the immunity probably takes a considerable time, for eosinophilia may persist for some years in white people who have returned to England with some helminthic infection. The results of the blood examinations of adults are as follows:—

—	Red cells.	Haemoglobin.	White cells.	Polymorphonuclear.	Large mononuclear.	Lymphocytes.	Eosinophiles.	Transitionals.
		Per cent.		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
I. Female (case of sleeping sickness). Aet. 26. Aug. 19.	2,160,000	60	3,750	52	30	14	4	0
Just before death. Sept. 29.	3,100,000	64	26,800	72	15	13	0	0

P. M. Helminths recovered:—*Schistosomum haematobium*, *F. perstans*, *A. duodenale* (many), *A. lumbricoides* (many), *Trichocephalus trichiura* (many).

—	Red cells.	Haemoglobin.	White cells.	Polymorphonuclear.	Large mononuclear.	Lymphocytes	Eosinophiles.	Transitionals.
II.								
Male (case of sleeping sickness). Aet. 32. Aug. 15.	4,000,000	78	6,870	56	28	12	1	3
Some days before death. Aug. 20.	6,200,000	100	22,000	70	17	13	0	0

P. M. Helminths recovered:—Ankylostomes (many), *A. lumbricoides* (few), *F. perstans* (few).

III. Male (case of sleeping sickness). Aet. 45. Oct. 15.	2,800,000	76	21,800	72	10	16	2	0

P. M. Helminths recovered:—Bilharzia eggs in faeces, *F. perstans* (slight); other helminths not looked for.

IV.								
Male (case of sleeping sickness). Aet. 24. Sept. 11.	2,771,000	65	9,000	50	22	20	2	5
Sept. 29	2,960,000	65	16,800	74	6	16	2	2

P. M. Helminths recovered:—*Schistosomum haematobium, A. duodenale, A. lumbricoides, Trichocephalus trichiura, F. perstans* (few).

That in heavy infections the absence of a corresponding degree of eosinophilia is not due to the impending death of the patients is brought out by the above table. Other instances in persons in perfect health were observed by the author. It is obvious that an absence of eosinophilia cannot be held any longer to be a sufficient reason for regarding a person as free from worms.

R. T. L.

Unclassed.

Tirumurti (T. S.). **An Interesting Case of Multiple Hydatid-Echinococcal Infection of the Abdominal Viscera.**—*Indian Med. Gaz.* 1912. Aug. Vol. 47. No. 8. pp. 314–317.

The author gives a detailed account of the history and clinical picture of a case of multiple hydatid infection, in which post mortem examination revealed the presence of an enormous thick-walled mother cyst filled with daughter and grand-daughter cysts and large flakes of a pultaceous greenish material. This cyst was completely extraperitoneal and almost filled the abdomen. The stomach and intestines were displaced to the right side under the liver and were enclosed in a small bag

of peritoneum. Small cysts were found in numbers in the mesentery, omentum, and liver. The lungs, stomach, intestines, and heart had escaped infection. In all about 500 cysts were collected. Most contained a clear transparent fluid, but in two cysts the fluid was reddish and in others of a light greenish tinge. The specific gravity of the fluid in the clear cysts was only 998. Its reaction appeared faintly alkaline to litmus, distinctly so to phenolphthalein. A dense precipitate of albumin and a similar indication of the presence of chlorides and reducing substances resulted from an application of the usual tests. It is remarked, however, that as the tests were made upon cysts kept in formalin for six hours after the death of the patient some of the reactions may have been unreliable.

R. T. L.

JACKSON (Thomas). **Cases of Hydatid Cyst.**—*Indian Med. Gaz.* 1912. Aug. Vol. 47. No. 8. pp. 313–314,

During the previous fifteen months the author had seen five cases of hydatids coming from centres so far apart as Karachi, Lucknow and Ahmedabad. Although the cases themselves do not illustrate any new features of importance, their occurrence indicates that the disease is widespread and possibly increasing in prevalence in India.

R. T. L.

HENRY (A.) et CIUCA (A.). **Essais d'Anaphylaxie à l'Aide de Produits Parasitaires.**—*Compt. Rend. Soc. Biol.* 1912. June 21. Vol. 72. No. 22. pp. 983–984.

While the authors were engaged upon investigations on the bladder worm (*Coenurus serialis*) in the domesticated rabbit, some attempts were made to ascertain whether the phenomena of anaphylaxis could be determined either with the substance or fluid of the parasite, or with the serum of the host. Guinea-pigs injected with the fluid of *Coenurus serialis* always became highly sensitised to this substance. An aqueous extract of the heads and of the membranous portions, on the other hand, gave only a slight degree of sensibility. When injected with fluid from *Cysticercus cellulosae* (of the sheep) or from *Echinococcus polymorphus* (the common hydatid) the animals were almost unaffected by the injection of fluid from *Coenurus serialis*. In guinea-pigs, injection of the serum of a rabbit infected with *Coenurus serialis* induced a non-fatal anaphylaxis.

R. T. L.

LESLIE (A. S.). **Intestinal Parasites in Lower Burma.** [Correspondence.]—*Indian Med. Gaz.* 1912. July. Vol. 47. No. 7. pp. 294–295.

During 1911 the faeces of 1,000 new admissions to the Insein Jail were consecutively examined microscopically, and as they were all adult males from the Delta of the Irrawaddy the results are published as an additional contribution to the recent articles in

the *Indian Medical Gazette* on the subject of intestinal parasites. There were found with :

	Cases.
Ova of *Ascaris lumbricoides* alone	195
,, ,, *Trichocephalus dispar* alone	95
,, ,, *Ancylostoma duodenale* alone	40
,, ,, ,, and ascaris	18
,, ,, ,, ascaris and trichocephalus	5
,, ,, ,, and trichocephalus ...	3
,, ,, Ascaris and trichocephalus	51
,, ,, *Oxyuris vermicularis*	2
Segments of *Taenia solium*	1
Total	410

To ascertain more accurately the incidence of ankylostome eggs 200 of the original thousand cases were re-examined in more detail, when it was ascertained that these eggs occurred in thirteen per cent. of the cases. The presence of ankylostomes did not appear to affect the health of the patient to any serious extent as a rule. The haemoglobin content of the blood in 45 cases of infection with ankylostomes, determined by Tallquist's method, ranged as follows:—Five cases one hundred per cent.; fourteen cases ninety per cent.; twelve cases eighty per cent.; nine cases seventy per cent.; and five cases sixty per cent.

R. T. L.

SHRIKHANDE (S. C.). **Death from Round Worms in the Throat.** [Correspondence.]—*Indian Med. Gaz.* 1912. July. Vol. 47. No. 7. p. 296.

A child of four years of age, after a successful operation for harelip, grew very restless during the night, and, tossing his limbs and struggling for breath, died before the arrival of the Assistant Surgeon. As the patient had been fairly healthy and was without heart or lung trouble and had taken the anaesthetic well, the cause of death remained inexplicable until during preparations for burial a bundle of living round worms was detected in the throat. It would appear that death resulted from a spasm of the glottis due to the entrance of the worms into the larynx.

R. T. L.

MISCELLANEOUS.

RICHARDS (Owen) and DAY (Harold B.). **Egyptian Splenomegaly and its Surgical Treatment.**—*Trans. Soc. Trop. Med. and Hyg.* 1912. July. Vol. 5. No. 8. pp. 333–363.

The authors state that a form of splenomegaly associated with hepatic cirrhosis is common in all parts of Upper and Lower Egypt, the disease closely resembling in its various stages the disorders described elsewhere as splenic anaemia (of infants and adults), pseudo-leukaemia infantum, simple splenomegaly and Banti's disease. Day describes the clinical and pathological side of the malady, Richards the surgical.

The condition, according to FERGUSON, is found in an easily recognisable form in no less than ten per cent. of autopsies performed on natives dying in the Government hospital at Cairo. It may be met with at all ages up to 30, but in infants and children is apt to run a severe course, while at a later age the chronic form, progressing to ascites, is the type almost exclusively encountered. The poorer native classes of either sex are chiefly, if not exclusively, attacked, Day never having seen a marked case in an upper class adult nor in a resident European.

The symptoms are fairly constant. There is irregular fever, wasting, and striking pallor; the spleen begins to enlarge and becomes hard and firm while the liver, though retaining its normal consistency, also increases in size. Sudden rises of temperature to 101° to 102° for one to three days are seen in about a third of the patients. The spleen and liver both go on enlarging steadily and produce a characteristic expansion of the lower part of the thorax and upper part of the abdomen, which is specially noticeable and easily recognised. The apex beat of the heart is often seen in the fourth space. The liver now is hard and firmer than normal. Apparently in mild cases the disease may come to a natural termination, leaving but slight traces of its passage, but more commonly it runs into a subacute or chronic condition with the final development of ascites. The patient then is much emaciated, the liver contracted and nodular, and the spleen, which at one stage may have been very big, is now of more ordinary dimensions.

The blood changes resemble those seen in other forms of splenic anaemia. In chronic cases there is anaemia and a marked leucopenia. In some of Day's cases, however, the large mononuclear leucocytes in the differential counts were very markedly increased.

Complications and concomitant disorders are frequent.

The duration of the disease varies but the course is always protracted, especially in older children and adults. Ascites is always an unfavourable symptom and, if the fluid rapidly reaccumulates after tapping, a fatal termination may be expected within six months of the onset. When there is not marked

wasting the ascites has been seen to disappear, at any rate for a time.

As regards the morbid anatomy, Ferguson states that the spleen is firm in consistence and of a dark brown red colour, and exudes very little blood on pressure. The vessels are relatively small and the Malpighian bodies almost indistinguishable. Microscopically a general hyperplasia is seen and active phagocytosis on the part of the macrophages towards the red-blood corpuscles and leucocytes. This, Ferguson thinks, may explain the peculiar character of the anaemia. In the early stages the liver cells are granular and swollen, and isolated necrotic foci surrounded by collections of small mononuclear cells are met with, resembling those seen in typhoid. Later the organ presents the picture of a multilobular cirrhosis and in most patients dying with ascites is reduced in size. The bone marrow is altered, that of the shaft of the femur being a red colour. No constant changes are met with in the other abdominal or in the thoracic viscera. So far no cause for the disease has been demonstrated and Day has not obtained any satisfactory evidence of the responsibility of some organism of the Leishmania type.

Medical treatment is of little avail, no drug seeming to influence the onward march of the symptoms. Salvarsan given in three cases failed.

The second part of the paper deals with the operative procedures for removal of the spleen. Richards for surgical purposes divides the disease into two groups: (a) the cases in which the cirrhosis of the liver and ascites are the chief features and (b) those in which enormous enlargement of the spleen is the most prominent symptom. As regards (a), nothing can be done to relieve the cirrhosis, but as regards (b) there seems a reasonable chance that removal of the spleen will get rid of the main source of the disease. Thirteen cases were operated upon with the following results:—Four died within five months; in two the spleen could not be removed; three have only recently been operated on; and four appear to be cured (five to eight months' observation).

As regards the fatal cases Richards is forced to the conclusion that they were not fit for operation. The risk appears to increase as the cirrhosis of the liver becomes more advanced, but in cases on the border line so much improvement follows careful treatment and rest in hospital that an unsuitable case may sometimes be converted into a suitable one by these means. As regards the difficulty of the operation itself, this chiefly depends on the presence or absence of adhesions, which vary very much in extent and the existence of which cannot be foreseen.

A detailed account of the operation is given. The conclusions reached by the two authors are as follows.—

1. "A chronic disease, marked by progressive enlargement of the spleen and cirrhosis of the liver, is common in Egypt. Its cause is as yet unknown, but its clinical course is quite characteristic.
2. "Medical treatment improves the condition of the patients, but does not arrest the progress of the disease.
3. "Cases in which the cirrhosis of the liver has advanced to the stage of ascites and jaundice are not fit subjects for radical surgical treatment.
4. "Cases with moderate cirrhosis of the liver and great enlargement of the spleen can be restored to health by excision of the spleen."

G. C. L.

GABBI (Umberto). **Spleno-epatomegalia Cronica Febbrile (da Virus Ultramicroscopico ?) con Varietà Poliadenitica.** [Chronic Febrile Spleno-hepatomegaly with a Polyadenitic Variety (? Ultramicroscopic Virus)]—*Malaria e Malat. d. Paesi Caldi.* 1912. July-Aug. Vol. 3. No. 7–8. pp. 199–229.

In this paper the author describes what he considers to be a new disease of adults of all ages in Italy. In many respects there is a close resemblance to the symptomatology of kala azar, for there occur the profound anaemia with consequent haemorrhages and oedemas, the irregular fever, the large spleen and liver, and intestinal disturbances. The disease is quite unaffected by any form of quinine treatment. The most careful examination by all methods of the peripheral blood and of material obtained by spleen puncture has failed to reveal any parasites, either bacterial or protozoal; tubercle and syphilis have been excluded. The author is convinced that the disease is neither malaria nor kala azar. He is quite aware of the caution that is necessary in making such a statement, but he has come to this conclusion after several years of observation. Experiments in which spleen puncture material was injected into monkeys yielded uncertain results; one monkey developed febrile symptoms and died. The parasite he believes to be ultramicroscopic. It is pointed out that other observers have noticed a similar disease in other countries. For instance, WOOLLEY (1906) described cases of tropical febrile splenomegaly in the Philippine Islands. FAICHNIE and BOND have described a similar disease, and BALFOUR has recorded two cases from the Blue Nile.

C. M. W.

BALFOUR (Andrew). **A Blood Puzzle Solved. The So-called X Bodies.**—*Lancet.* 1912. July 6. pp. 24–25.

Balfour draws attention to an interesting and useful paper by CHAMBERLAIN and VEDDER,* in which these observers show that the so-called X bodies, which have been found in smears of human and other blood, are in reality of the nature of artefacts in the glass slides on which the blood films are made, and that such artefacts are probably more common in old slides kept for long periods of time in the tropics. After reading CHAMBERLAIN and VEDDER's paper, Balfour succeeded in finding a slide showing a fair number of the smaller variety of X bodies. He thereupon repeated the former authors' washing experiment and as a result confirms their opinion as to the true nature of the bodies. Balfour believes that the X bodies are quite unlike the usual fallacies associated with flaws in glass slides, with which most haematologists are familiar. Considerable credit, he thinks, should be given to CHAMBERLAIN and VEDDER for clearing up one of the many blood puzzles which have troubled tropical workers. This discovery is, as he says, a good example of the necessity for testing not only our reagents but our tools and of approaching all blood problems with an unbiased mind.

G. C. L.

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* *Philippine Jl. of Science.* 1911. Vol. 6. No. 5. p. 421.

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